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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

214255605002

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

10/070981

INTERNATIONAL APPLICATION NO.
PCT/US00/25209

INTERNATIONAL FILING DATE
September 15, 2000

PRIORITY DATE CLAIMED
September 16, 1999

TITLE OF INVENTION

Computer Based Patient Record Management System and Method

APPLICANT(S) FOR DO/EO/US

Schwartz et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ has been communicated by the International Bureau.
 - c. ☒ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
 - a. ☐ is attached hereto.
 - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

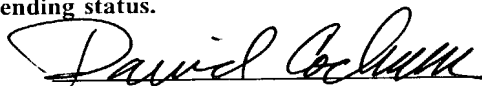
11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☐ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with 37 CFR 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items or information:
Declaration and Power of Attorney

Express Mail Mailing Label 100.

Date of Deposit March 8, 2002

I hereby certify that this paper or fee is being deposited with the United States Postal Service under 37 CFR 1.10 on the date indicated above and is addressed to: Commissioner for Patents, Washington, D.C.

By Kathie J. Koppay

U.S. APPLICATION NO. (if known) 10/070981		INTERNATIONAL APPLICATION NO PCT/US00/25209		ATTORNEY'S DOCKET NUMBER 214255605002																																																												
<div>21. <input checked="" type="checkbox"/> The following fees are submitted:</div> <div>BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):</div> <div>Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO..... \$1040.00</div> <div>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00</div> <div>International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00</div> <div>International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00</div> <div>International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00</div> <div>ENTER APPROPRIATE BASIC FEE AMOUNT =</div> <div>Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).</div>				CALCULATIONS PTO USE ONLY																																																												
<table border="1" style="width:100%; border-collapse: collapse;"><thead><tr><th style="width:20%;">CLAIMS</th><th style="width:20%;">NUMBER FILED</th><th style="width:20%;">NUMBER EXTRA</th><th style="width:20%;">RATE</th><th style="width:20%;"></th></tr></thead><tbody><tr><td>Total claims</td><td>15 - 20 =</td><td>0</td><td>x \$18.00</td><td>\$ 0</td></tr><tr><td>Independent claims</td><td>5 - 3 =</td><td>2</td><td>x \$84.00</td><td>\$ 168.00</td></tr><tr><td colspan="3">MULTIPLE DEPENDENT CLAIM(S) (if applicable)</td><td>+ \$280.00</td><td>\$</td></tr><tr><td colspan="4" style="text-align: right;">TOTAL OF ABOVE CALCULATIONS =</td><td>\$ 268.00</td></tr><tr><td colspan="4" style="vertical-align: top;"><input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.</td><td style="text-align: right;">\$ 134.00</td></tr><tr><td colspan="4" style="text-align: right;">SUBTOTAL =</td><td>\$ 134.00</td></tr><tr><td colspan="4" style="vertical-align: top;">Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).</td><td style="text-align: right;">\$ -0-</td></tr><tr><td colspan="4" style="text-align: right;">TOTAL NATIONAL FEE =</td><td>\$ 134.00</td></tr><tr><td colspan="4" style="vertical-align: top;">Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +</td><td style="text-align: right;">\$</td></tr><tr><td colspan="4" style="text-align: right;">TOTAL FEES ENCLOSED =</td><td>\$ 134.00</td></tr></tbody></table>				CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		Total claims	15 - 20 =	0	x \$18.00	\$ 0	Independent claims	5 - 3 =	2	x \$84.00	\$ 168.00	MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280.00	\$	TOTAL OF ABOVE CALCULATIONS =				\$ 268.00	<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$ 134.00	SUBTOTAL =				\$ 134.00	Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$ -0-	TOTAL NATIONAL FEE =				\$ 134.00	Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$	TOTAL FEES ENCLOSED =				\$ 134.00	<table border="1" style="width:100%; border-collapse: collapse;"><tr><td style="width:50%;"></td><td style="width:50%; text-align: right;">Amount to be refunded: \$</td></tr><tr><td></td><td style="text-align: right;">charged: \$</td></tr></table>			Amount to be refunded: \$		charged: \$
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<div>a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>134.00</u> to cover the above fees is enclosed.</div> <div>b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</div> <div>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>50143</u>. A duplicate copy of this sheet is enclosed.</div> <div>d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</div>																																																																
<div>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.</div> <div>SEND ALL CORRESPONDENCE TO: David B. Cochran Jones, Day, Reavis & Pogue North Point 901 Lakeside Avenue Cleveland, OH 44114</div>						<div style="text-align: center;"> SIGNATURE</div> <div style="text-align: center;">David B. Cochran NAME</div> <div style="text-align: center;">39,142 REGISTRATION NUMBER</div>																																																										

22. A computer implemented medical record system, comprising:

a graphical user interface including first, second and third screens organized into a subjective, objective, assessment, and plan (SOAP) format;

the first screen being operative to accept data input relating to summary data, the summary data including patient vital signs, patient history, patient complaint, patient allergies, patient medications, and patient problem data;

the second screen being operative to accept data input relating to patient history and physical examination data; and

the third screen being operative to accept data input relating to order entry data, the order entry data being determined by a user of the system by referencing the summary data and the history and physical examination data.

23. The system of claim 22, further comprising a plurality of visit outlines selectable by a user of the system, each visit outline modifying a data input field in one of the first, second and third screens when selected.

24. The system of claim 23, wherein the system requires the user of the system to input data in a modified data input field.

25. The system of claim 22, wherein the graphical user interface further comprises a carepath module for suggesting a particular medical treatment in response to the data input in the first, second and third screens, the module also prompting the user to input patient data relevant to a corresponding particular treatment regimen.

26. The system of claim 22, wherein the graphical user interface further includes an All Normal structure to input data having normal patient parameters into the screens.

27. The system of claim 22, further comprising a data repository including genogramatical data, the graphical user interface communicating with the data repository.

28. A computer implemented medical record system comprising a graphical user interface including an automated carepath module for receiving medical treatment data by a user of the system, the carepath module suggesting medical treatments and prompting for additional relevant medical data in response to receiving the medical treatment data.

29. The system of claim 28, wherein the graphical user interface further includes first, second and third screens organized into a subjective, objective, assessment, and plan (SOAP) format;

the first screen being operative to accept data input relating to summary data, the summary data including patient vital signs, patient history, patient complaint, patient allergies, patient medications, and patient problem data;

the second screen being operative to accept data input relating to patient history and physical examination data; and

the third screen being operative to accept data input relating to order entry data, the order entry data being determined by a user of the system by referencing the summary data and the history and physical examination data.

30. The system of claim 29, further comprising a plurality of visit outlines selectable by a user of the system, each visit outline modifying a data input field in one of the first, second and third screens when selected.

31. The system of claim 30, wherein the system requires the user of the system to input data in a modified data input field.

32. The system of claim 28, wherein the graphical user interface further includes an All Normal structure operative to input normal parameters for all fields.

33. The system of claim 28, further comprising a data repository including genogramatical data, the graphical user interface communicating with the data repository.

34. A method of managing patient medical treatment data, comprising:
recording medical treatment data of a patient into data fields in a medical record system graphical user interface;

entering complaint specific information during a history and physical examination into the data fields

modifying automatically the format of the data field in response to the entered medical treatment and complaint specific data;

assessing the patient in response to the medical treatment and complaint specific data; and

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making medication orders in response to the medical treatment and complaint specific data through an order entry screen.

35. A method of managing patient medical treatment data, comprising:
- providing a graphical user interface including first, second and third screens organized into a subjective, objective, assessment, and plan (SOAP) format;
 - accepting data in the first screen relating to summary data, the summary data including patient vital signs, patient history, patient complaint, patient allergies, patient medications, and patient problem data;
 - accepting data in the second screen relating to patient history and physical examination data; and
 - accepting data in the third screen relating to order entry data, the order entry data being determined by a user of the system by referencing the summary data and the history and physical examination data.

36. A method of managing patient medical treatment data, comprising:
- providing a graphical user interface including an automated carepath module for receiving medical treatment data by a user of the system;
 - suggesting medical treatments by the carepath module in response to the received medical treatment data; and
 - prompting for additional relevant medical data by the carepath module in response to the received medical treatment data.

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**COMPUTER BASED PATIENT RECORD MANAGEMENT SYSTEM
AND METHOD**

Cross Reference to Related Applications

This application claims priority to Provisional Application Ser. No. 60/154,305, filed September 16, 1999.

Field of the Invention

The present invention relates to the field of medical record keeping systems and methods. The invention provides a computer-based patient record management system and method.

Background

Medical service providers, physicians for example, generate a large volume of information relating to a patient during a course of treatment. This large volume of information contains such items as x-ray and magnetic resonance images, laboratory results, physician's diagnoses, and medication and treatment history, to name but a few. Also, billing and insurance information can be gathered and filed. Some of the items of information can be contained in a physical file, or may be set forth on a paper chart. Other items may be stored in a separate file, a separate department, at another facility, or even at another treatment center. Of all the information kept on a patient in the medical system today, the paper chart is considered to be the most antiquated collection of important documents.

Computer systems typically store large amounts of data in databases employing non-volatile computer memory. Data stored in databases commonly is organized into individual records. Most of these records can be

accessible to a user through a graphical user interface (GUI). A GUI can provide a visual metaphor of a real world scene, such as a desktop, featuring icons or buttons that the user can manipulate with a pointing device, such as a mouse. The database user therefore may access a selected database by clicking on a GUI button representing the database, responsively causing the computer to display the contents of the selected database in an easy to understand format. This format itself is a GUI that enables the user to further access and manipulate the database.

Computer data processing has been used by medical service providers in the creation, use, and maintenance of patient records. Also, a clinical information reporting system having an electronic database including electrocardiograph related patient data is known. A computerized scheduling and reporting system for managing information pertinent to a patient's stay in a hospital has likewise been previously implemented. These products were highly deficient in many respects, including having limited capabilities, being excessively complex and slow, and being implemented with restrictive technology that slows the medical service provider.

Summary

A point-of-care computer-based patient record (CPR) system and method is provided. Using this system, a medical service provider can enter data regarding a patient encounter and subsequently diagnose and treat a patient. The enabling software includes a number of component modules that can be implemented through a three-screen graphical user interface that can emulate the traditional medical service providers' interactions with the patient. The system can also include one or more carepaths integrated into the CPR

system to assist the medical service provider in diagnosing and treating patients.

5 In a first embodiment, the present invention provides a graphical user interface for medical data entry into a database. The graphical user interface includes a summary screen allowing summary information to be entered into the database, a history and physical examination screen allowing history and physical examination information to be entered into the database, and an order entry screen allowing order entry information to be entered into the database.

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The present invention also provides a computer-implemented medical data entry system including a graphical user interface. The graphical user interface includes a summary screen, a history and physical examination screen, and an order entry screen. In this aspect, the system further includes a means for selecting one of the foregoing screens to be displayed.

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In another aspect, the invention provides a computer-implemented method for generating a graphical user interface for documenting a patient encounter. The method includes the step of providing a computer having a display. The method also includes the step of generating a graphical user interface on the display. The graphical user interface includes a first screen for entry of summary patient information, a second screen for entry of history and physical examination information, and a third screen for entry of order information. The method further includes the steps of entering a diagnosis via the graphical user interface and selecting a treatment in response to the entered diagnosis.

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25

In another aspect, the present invention also provides a computer-implemented system having a memory, a display, and a computer operative to

generate a graphical user interface on the display. The graphical user interface includes a display view that includes a plurality of representations. These representations are grouped into a summary group, including representations having an input window operative to receive summary information, a
5 history/physical exam group, including representations having an input window operative to receive history/physical exam information, and an order entry group including representations having an input window operative to receive order entry information. The graphical user interface also includes a plurality of tabs. Each tab corresponds to a single representation group, and
10 responds to selection of the tab by displaying the corresponding representation group.

A second embodiment of the invention provides a system to facilitate compliance with a carepath. The system includes a computer having a
15 memory capable of storing patient information in a first datafile and carepath regimen information in a second datafile. The system also includes software that is operative to receive patient information, to compare the patient information with the carepath regimen information, and to suggest a carepath regimen compliant treatment. The first datafile can be a plurality of single,
20 concatenated files for storing information on multiple patients.

In another aspect, the second embodiment of the invention provides a computer-readable storage medium that includes a first and/or second set of computer executable codes. The first set of codes is for carrying out the
25 following steps. The steps are: (i) providing a database containing a plurality of predetermined diagnoses that correspond to carepath compliant treatments, (ii) accessing the database, (iii) entering a patient diagnosis into the database, (iv) matching the patient diagnosis to one of the predetermined diagnoses to

determine the corresponding carepath compliant treatment, and (v) suggesting a carepath compliant treatment.

5 The second set of codes is for carrying out the following steps: (i) providing a database containing patient information, (ii) accessing the database, (iii) displaying the patient information, (iv) entering additional patient information and a diagnosis to the database via a three-screen graphical user interface, and (v) selecting a treatment in response to the diagnosis.

10 A method of using the system of the present invention is also provided. The method is a stepwise account of a patient encounter including data entry using this system. The patient encounter reflects the segmented approach of logging into the system and opening a patient chart as a first segment, then continuing the patient encounter by performing steps relating to the summary
15 segment. In addition, the steps relating to the history and physical examination segment, and the order entry segment are performed.

Brief Description of the Drawings

20 Figure 1 is a diagram showing a CPR system Login screen;

Figure 2 is a diagram showing a Held Charts screen;

Figure 3 is a diagram showing a Patient List screen;

25

Figure 4 is a diagram showing a Summary screen and also showing a Summary tab, a History and Physical Examination tab, and an Order Entry tab;

Figure 5 is a diagram showing a Summary screen;

Figure 6 is a diagram showing a portion of the process of modifying an Allergy item of a Summary screen using an Allergy pop-up tool;

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Figure 7 is a diagram showing an updated Summary screen;

Figure 8 is a diagram showing a History and Physical Examination screen with a blank Chest Pain Visit Outline displayed;

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Figure 9 is a diagram showing the use of a pop-up tool to record a duration, a History and Physical Examination screen is visible in the background;

15 Figure 10 is a diagram showing an example of using a picklist for a Patient History item, a History and Physical Examination screen is visible in the background;

20 Figure 11 is a diagram showing an example of using pickgroups to determine the content of a Visit Outline;

Figure 12 is a diagram showing a Location pop-up tool over a History and Physical Examination screen;

25 Figure 13 is a diagram showing a History and Physical Examination screen with a completed History and Physical Examination;

Figure 14 is a diagram showing the process of browsing past documents;

Figure 15 is a diagram showing a Patient Labs screen;

Figure 16 is a diagram showing an Analysis screen;

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Figure 17 is a diagram of a Provider Labs screen;

Figure 18 is a diagram showing an Order Entry screen including suggestions;

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Figure 19 is a diagram showing a Medications pop-up tool with an Order Entry screen visible in the background;

Figure 20 is a diagram showing how assessments and orders can be made through an Order Entry screen;

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Figure 21 is a diagram of a Sign-Off screen;

Figure 22 is a diagram showing an encounter note with Signature Lines;

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Figure 23 is a diagram showing a prescription Sign-Off report;

Figure 24 is a diagram showing a Locked Chart; and

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Figure 25 is a flowchart showing the way a medical service provider and staff can use the present invention to guide and document a patient encounter.

Detailed Description of the Drawings

The present invention provides a comprehensive computerized patient record (CPR) system having aspects not found in presently known electronic medical record (EMR) systems. The first aspect includes a graphical user interface with a three-screen organization method. The three-screen organizational method organizes data entry tasks to conform with the way that medical care providers are trained to gather and evaluate data. The second aspect of the present invention involves the integration of the patient encounter with a carepath regimen, a wellness guide, or the like.

Since the advent of the problem-oriented medical record, medical service providers have been taught to keep their records in SOAP format. SOAP is an acronym for Subjective, Objective, Assessment, and Plan. The CPR system of the present invention is organized in the same way through its three-screen graphical user interface, thereby mimicking the way medical service providers think. By closely corresponding the medical service provider patient encounter to the SOAP format, the CPR system reduces data entry and organization to three screens. This makes the CPR system workable at the point-of-care. The CPR system preferably utilizes a large screen 8 with a resolution of at least 1024 by 768 in order to present the information the medical service provider needs in a minimum number of screens. Because current programming styles use much of the screen for what programmers call controls - buttons, tabs, frames, et cetera - less than fifty percent of the screen 8 can be available for the display of data. By minimizing the number of controls onscreen and presenting more useful data to the medical service provider, the CPR system uses a high percentage of the screen 8 for data without clutter.

The Figures show many graphical user interface elements that are substantially the same from one Figure to another. This is indicated by the use of the same reference numbers for such corresponding parts.

5 In a first embodiment of the invention, the CPR system includes a graphical user interface that medical providers who are not experienced computer users can use effectively with little training. The CPR system starts with a Log-on screen 10 shown in Figure 1. The Log-on screen 10 allows for secured access using a Name entry field 12 and a Password entry field 14.

10 After inputting a valid name and password in the appropriate entry field in the Log-on screen 10, a graphical interface having a plurality of tabs along a side is displayed. Exemplary tabs include a Schedule tab 16, a Messages tab 18, an Analysis tab 20, a Provider list tab 22, a Labs tab 24, a Radiology tab 26, a Consults tab 28, a Patient List tab 30, and a Held Charts tab 32. The two

15 preferred routes to the patient chart are through the Held Charts tab 32 and the Patient List tab 30, which are discussed immediately following. Other tabs are discussed where appropriate.

The Held Charts tab 32 displays the Held Charts screen 34 when

20 selected, as shown in Figure 2. The Held Charts screen 34 includes a Held Charts list 36 and an Outstanding Charts list 38. During the course of a patient encounter, several providers may need to work with the patient's chart. An active CPR system chart can be temporarily closed and held over by a first provider for later use by a second provider. From the Held Charts screen 34,

25 the second provider can then reopen the chart to the point at which it was held. The Held Charts list 36 on the Held Charts screen 34 shows all charts that have been held for the second provider. The Outstanding Charts list 38 shows all charts that the first provider has held, and which are still undergoing an encounter.

Also available for selection, after satisfying the Log-on screen 10, is the Patient List tab 30. Selection of the Patient List tab 30 opens the Patient List screen 40 shown in Figure 3. The Patient List screen 40 includes a plurality of sections. Each section includes patient information. The Patient List screen 40 can provide access to all patients in the CPR system. The Patient List screen 40 can display a variety of demographic information for each patient and is preferably fully searchable and sortable on all displayed information. Upon finding a given patient, a provider may start a new encounter by highlighting the patient's listing and clicking the View Chart button 42 at the bottom of the graphical interface or by double-clicking on the listing. The Add New Patient button 44 opens a blank demographics graphical interface where a new patient can be added to the system by simply entering, for example, the patient's name, birth date, and sex. The Modify button 46 allows a provider to quickly view and or modify the demographics for an existing patient.

After a patient chart has been selected from the Held Chart screen 34 or the Patient List screen 40, a Summary screen 50 is displayed as shown in Figure 4. Also shown are three tabs that correspond to three data-entry graphical interfaces. The tabs are the Summary tab 52, the History and Physical Examination tab 53, and the Order Entry tab 54. The tabs can be selected using a mouse and can display a corresponding screen in response to the selection. The History and Physical Examination tab 53 uses the abbreviation Hx & PE and corresponds to a screen for entry of History and Physical Examination information shown in Figure 8. The Order Entry tab 54 corresponds to a screen for Order Entry information shown in Figure 14. The three tabs together are used for data entry in accord with the SOAP format method. The Summary screen 50 and a screen for History and Physical

Examination medical data entry facilitate entry of the S and O portion of the SOAP format. A screen for Order Entry information facilitates the entry of the A and P portion.

5 The tabs along the side of the graphical interface shown in Figure 4 are useful to view data in the patient chart. The tabs can include a Time Line tab 56, an Analysis tab 58, a Data Sheets tab 60, an All tab 62, a SOAP tab 64, a Labs tab 24, a Radiology tab 26, a Medications tab 66, and a Consults tab 28. These tabs similarly display a corresponding screen when selected. The
10 corresponding screen can provide the medical care provider with a variety of information useful at different stages of the examination. The tabs are discussed in context as they would naturally be used by a medical care provider.

15 The Summary screen 50 shown in Figure 4 includes summary items that facilitate the entry of medical data corresponding to the S and O portion of the SOAP format. Summary items can be such things as a Vital Signs item 70, a Problem List item 72, a Wellness item 74, a Chief Complaint item 76, an Allergies/Alerts item 78, a Current Medications item 80, an Events item 82,
20 and other subjective and objective information. A Chief Complaint item 76 is distinct from the Reason for Visit field 84 in that the Chief Complaint item 76 is the patient's description of the problem and the Reason for Visit field 84 is supplied by the medical care provider. A digitized image 88 of the patient can be inserted into the chart to ensure the correct chart is being used at
25 all times.

The Summary screen 50 facilitates entry of data into the summary items using pop-up tools. A nurse can enter any relevant data into the CPR system for review by a physician prior to the examination of a patient.

Preferably, the objective information, such as a patient's vital signs, can be measured and entered by a nurse or a technician. The Summary screen 50 allows a physician to prepare to see a patient by maintaining and presenting relevant information. By maintaining this information and presenting it in an easy to read format, the CPR system allows physicians to familiarize themselves with their patients quickly and effectively.

An example of a pop-up tool for data entry into a summary item is shown in Figure 5. The pop-up tool shown is the Medications pop-up tool 90, and is specific to the Current Medications summary item 80. The CPR system can automatically place an item in the patient's Events list 82 for each completed encounter. By clicking on a listing, a provider can view the note generated for that encounter

Figure 6 describes a portion of the process of searching for an item to insert into and modify a patient's chart. The lists in the patient chart that can be tied to auxiliary databases allow providers to search and/or sort through the information in the database using a pop-up window. By typing only a few characters, a provider can find an entire set of accurate information to insert into the chart. After finding the desired information in a search window, for example in the Medications pop-up tool 90, a provider can insert it into the Summary screen 50 by clicking on the listing. A provider can also choose to not insert some information from the database. If a patient reports a medication that had been prescribed to them by another medical service provider, and the patient is unsure of the dose that they were prescribed, the provider can use the Dose Unknown button 92 to record the medication with no known dose.

The Allergy pop-up 100 tool is shown in Figure 6 over the Summary screen 50. The Allergy pop-up tool 100 facilitates data entry into the Allergies/Alerts summary item 78. The Allergy pop-up tool 100 includes a Reconfirm Allergy button 102, an Allergen field 104, a Status field 106, a Date field 108, a Details field 110 useful for inputting notes, and a Groups field 112. The Groups field 112 can allow quick access to other allergens related to the allergen entered into the Allergen field 104. This can be useful to avoid medication conflicts and the proscriptio of related allergens, among other things. All of the Summary items can have pop-up tools to facilitate data entry. The pop-up tools remain hidden until an item is clicked.

Figure 7 shows a Summary screen 50 that has an updated Allergies/Alerts summary item 78. The updated Allergies/Alerts Summary item 78 reflects the data entry through the Allergy pop-up tool 100 shown in Figure 6. Note that in the Allergies/Alerts summary item 78, the date has been updated.

Figure 8 shows the second main graphical interface of the CPR system, the History and Physical Exam screen 110, with a blank data entry form for the Chest Pain Reason for Visit 84 displayed. The History and Physical Exam screen 110 is used to collect encounter-specific data from the patient. The History and Physical Exam screen 110 is used by a physician to enter patient data to complete the S and O portion of the SOAP format. Most of the time a medical service provider spends documenting an encounter is likely in the History and Physical Exam screen 110. The medical service provider picks one or more reasons for the patient's visit and the CPR system presents Visit Outlines of the data the medical service provider may want to collect, along with tools which facilitate rapid data collection.

To facilitate medical data entry, the History and Physical Exam screen 110 includes Data Entry Forms. Fully user customizable, Data Entry Forms designed with an outline structure are called Visit Outlines. Visit Outlines allow rapid navigation and auto-navigation (automatically moving focus from one item to the next in the outline) and use pop-up tools for rapid data entry. 5 The CPR system uses Visit Outlines to record the information that the medical service provider gathers from the examination. Visit Outlines both guide the examination by listing the information that should be collected, and serve as a template for how the information should be recorded. These Visit Outlines are not stipulated by the CPR system, but by the medical facility making use of 10 the system. The information that should be collected is listed in the Item column 112 and the type or format of the information collected is shown in the Value column 114. The History and Physical Exam screen 110 includes a Patent History section 116 and a Physical Exam section 118. The Patient 15 History section 116 is shown with a blank Visit Outline that begins with Duration 120 in the Chest Pain Visit Outline 122.

Visit Outlines make extensive use of pop-up tools. While some items in the Visit Outline may be type-in text fields, most lead to one of several pop-up tools when clicked. Pop-up tools allow the medical service provider to 20 quickly choose a date (with a calendar tool), a duration (with a calculator-like tool that constructs phrases, as shown in Figure 9), or make a selection from a list of choices. More in depth pop-ups can present an image on which a medical service provider can mark significant areas.

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When a specific diagnosis is entered, the CPR system calls up order sets that can include suggestions for possible labs, radiology, procedures, medications, and referrals related to the entered diagnosis. Any of these suggestions can be adjusted based on the sex and age of the patient.

Functionality in the CPR system allows a medical care provider the ability to suggest common diagnoses associated with given Visit Outlines.

If Visit Outlines covered every possibility, they would be extremely long and using them would be cumbersome. To accommodate exceptional situations, the CPR system provides add-on notations that can be attached to any item in a Visit Outline. The add-on notations, and certain other places where free text is required, can be coupled with speech-to-text programs that are preferably compliant with the speech application programming interface (SAPI) from Microsoft® (Redmond, WA).

Figure 9 shows the use of a pop-up tool to record a duration period. When a provider activates the Duration item 120 in the Chest Pain Visit Outline 122, a Duration pop-up tool 130 appears that allows the provider to quickly construct a phrase to describe a duration with few mouse clicks. When the provider has supplied enough information, the Duration pop-up tool 130 closes, leaving only the data entered visible in the Value column 114.

Figure 10 shows the use of a picklist 132, in this example the picklist 132 is for Ameliorating Factors 134 under the Nature of Pain item 136 in the Chest Pain Visit Outline 122. Much of the data entry in Visit Outlines can be accomplished with a picklist 132. The Picklist 132 can contain choices that can satisfy the information requested in the Item column 112. Users can enter a word or phrase into the Value column 114 by simply clicking on it in the picklist 132. The Picklist 132 can also be set up to limit what choices can be made. For example, the picklist 132 may allow the user to select only one choice or may allow the user to select from only one of several mutually exclusive categories.

Picklist choices can be tagged as Normal when Visit Outlines are designed. An example is the Chest Pain Visit Outline 122. The system can then automatically select normal picklist choices when a provider uses the All Normal button 138. The Thumbs Up button 140 can select all choices tagged
5 as normal from the picklist of which it is a part, and all picklists that are subsets of that picklist (the picklist shown has no subsets). Each All Normal button 138 at the bottom of the graphical interface selects all normal choices from the visible picklist items displayed on the History and Physical Exam screen 110.

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The N button 142 allows a provider to attach a free-text note to a picklist. In addition, the N button 142 allows a provider to annotate any item with a free-text note. Thereafter, any additional information typed into the note will be carried with that item.

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Figure 11 shows how pickgroups determine the content of a Visit Outline. Special picklists, called pickgroups, allow providers to determine the course of an exam. When a choice is made from a pickgroup 144, shown in Figure 11, the CPR system places a group of items onto the History and
20 Physical Examination screen 110 that was previously hidden from view. If hidden groups are not chosen they are not displayed, reducing screen clutter, streamlining the medical service provider's examination, and customizing the medical service providers experience. For example, pickgroups allow a neurologist recording hundreds of data points to navigate the History and
25 Physical Exam screen 110 as intuitively as a pediatrician documenting a sore throat.

A Location pop-up 150 is shown in Figure 12. The Location pop-up 150 is a graphical representation of a body or portion of a body that is divided

into named regions. This allows a provider to mark a region graphically by clicking on it. The Location pop-up 150 records mouse clicks as small Marked Areas 152. Marked Areas 152 are listed in the Value column 114. This clicking function is particularly useful for specifying where something is on a patient's body, but is not limited to this use. The Location pop-up 150 displays the name of the region designated by the mouse pointer. Accordingly, both a graphical representation of the marked region and the name(s) corresponding to the marked region are recorded. The picture, marks, and selected region names can then be included in an Encounter Note 154.

Figure 13 shows an exemplary, completed History and Physical Examination screen 110. By using pop-up tools such as the ones depicted by the previous pictures, a medical service provider can record any exam datum with a minimum of typing.

Tabs along the right side of a patient's chart provide access to stored data as mentioned above. Figure 14 shows the process of browsing an Encounter Note 154 that has been previously completed. While a medical service provider and his staff can document an entire patient encounter with only three screens, the CPR system chart can contain other information for quick perusal. This example shows the All screen 156, one of several places in the chart that a provider can access documents generated by the CPR system for the patient in the past. The All tab 62 provides access to past signoff documents. Much of the information available through the side tabs is presented in index format. Each item in the index can lead to more detailed information. Additional information about an item in an index can be obtained by clicking on the item's listing. Side tabs can track ongoing patient information, such as demographics, social history, and family medical history. Preferably, the CPR system graphically maintains family medical history in a

genogram. A genogram is a family tree that can carry pertinent medical information.

5 As seen in Figure 14, Encounter Notes 154 can be grouped by encounter. The documents from each encounter can be kept in an Encounter folder 158 and can be displayed or hidden as desired. The document whose name is highlighted is displayed in the example.

10 Another graphical interface is accessible by selecting the Labs tab 24. Figure 15 shows a Labs tab 24 and a Patient Labs screen 160. The Patient Labs screen 160 lists all labs and procedures ever ordered for the corresponding patient. The screen 160 can be split vertically; the left pane 162 can list the lab orders recorded for the patient and the right pane 164 can list labs ordered for the patient by type. The Patient Labs screen 160 can display a
15 document containing lab results as they are entered into the CPR system when a listing in either pane is clicked. For example, a lab may have been ordered three times for a patient. The left pane 162 can list the lab three times, but the right pane 164 will only list it once. When a user highlights a listing in the right pane 164, the CPR system will highlight all instances of that lab in the
20 left pane 162 as well. Clicking on a lab's listing in the left pane 162, displays the results of that instance of the lab. The items in the right pane 164 give access to the results for the most recent time the lab was ordered. Although not shown the Medications, Radiology, and Consults screens in the patient chart can be preferably set up the same as the Patient Labs screen 160.

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Figure 16 shows an Analysis screen 166, which is accessible by selecting the Analysis tab 58. The Analysis screen 166 provides access to the querying tool that creates reports and graphs from information in a patient's record. Information in the patient record can be found and either formatted in

hypertext markup language (HTML), graphed, or exported to an external database program for examination. Pre-written queries, including formatting, can be accessible from drop-down lists at the top of the graphical interface. Examples of drop down lists are the Available Graphs list 168 and the
5 Available Reports list 170.

A formula-language/script-authoring tool can be made accessible from a side tab, not shown. This tool can generate custom reports and graphs of all data stored for the patient. For example, a formula can be written to create a
10 lipid profile for a patient by finding all triglyceride and total cholesterol values that have been recorded and graphing them over time. Also, this macro function can be used to automate routine tasks.

Other graphical interfaces are also available for display via a side tab
15 selection, for example the Provider Labs screen 172, which is part of a provider's workspace, shows information from certain patient's records. As shown in Figure 17, the Provider Labs screen 172 can include a Labs Ordered section 173 and a Labs To Be Reviewed section 174. The Provider Labs screen 172 keeps the provider aware of outstanding labs and procedures
20 through the Labs Ordered 174 section and gives providers the ability to enter results and reviews for related items. The Radiology screen and Consults screen, not shown, can be constructed in a similar manner. The Labs Ordered 173 section shows all outstanding labs and procedures, that is, those that have not yet had results entered into the CPR system. Included in the Labs Ordered
25 section 173 are all items ordered by the provider and all those items that have been forwarded to the provider by another provider. The top part of the Provider Labs screen 172 lists all labs and procedures ready for the provider to review.

The Order Entry screen **180**, shown in Figure 18, is used to record the A and P part of the SOAP note. The Order Entry screen **180** includes such items as: an Assessment list **182**, a Radiology list **188**, a Medications list **190**, a Referrals list **192**, and a Future Appointments list **194**. The Assessment list **182** preferably facilitates the entry of both assessments and orders through the use of customizable Order Sets, which associate suggested orders with specific diagnoses. These Order Sets are not stipulated by the CPR system, but by the medical facility making use of the system. The medical service provider can also declare a problem and add it to the Problem list **72** directly from the Assessment list **182**.

Each of the lists on the Order Entry screen **180** can be tied to an auxiliary database. Items can be added to the lists of orders by either inserting sets of information from these databases or creating original items. The information recorded on the Order Entry screen **180** can be sent to an existing order entry system. The CPR system lists the suggestions made based on any of the several kinds of clinical decision making processes it supports. The suggestions shown in Figure 18 are based on wellness checks. For the medical service provider's convenience, the Medications list **190** on the Order Entry screen **180** displays all of the medications the corresponding patient is currently taking in addition to all of the newly ordered medications.

Figure 19 shows the Medications pop-up tool **196**. The CPR system records and displays medication summaries in list form on both the Summary and the Order Entry screens **50** and **180**. When a medical service provider clicks on a Medication list **180**, the Medications pop-up tool **196** appears, which lists active instances of the medication and the history for each instance. The Medications pop-up tool **196** allows the medical service provider to update the history of each instance separately and use individual instances as

templates for new scripts. The Medications list 180 on the Summary screen 50 and Order Entry screen 180 show the most recent active instance of equivalent medications, but the Medications pop-up tool 196 contains all active instances. Using this tool 196, a provider can independently make new
5 orders based on previous instances and view and modify the history of each active instance. All functionality can collapse behind one line of text. The Medications pop-up tool 196 includes a Select section 198, an Order section 200, and a History section 202.

10 In the example shown in Figure 19, the medical service provider has prescribed nitroglycerin and decided to give the patient a sample of it, as is also shown in the Select section 198 and Order section 200. The part of the order that describes the samples is shown on top of the prescription on the Order Entry screen 180. When the samples of nitroglycerin are given, the
15 medical service provider will click the Complete button 204 in the Medications pop-up tool 196. The medical service provider can also require that labs, procedures, and radiology be done during the current visit. If there are orders to be done prior to the end of the current visit that have not been marked as having been completed, the CPR system will not end the encounter.

20 Diagnoses and orders can be recorded with standard terminology and codes. This allows the CPR system to interface directly with existing billing systems if desired. The CPR system can also suggest orders to the medical service provider on the Order Entry screen 180. These suggestions can be
25 practice-specific and can be based on diagnoses, wellness checks, or carepaths. These suggestions are collectively referred to as carepaths.

Figure 20 shows how assessments and orders can be made through the CPR system using the Order Entry screen 180. The areas on the Order Entry

screen 180 can be tied to auxiliary databases to facilitate accurate ordering. Providers can search and choose from these databases and modify their selections using the same process as on the Summary screen 50, as shown in Figures 6 and 7.

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Figure 21 shows the Sign-off screen 210. When a chart is either held or signed, a corresponding screen appears that provides the tools to close the chart and that displays the documents the CPR system has generated for the encounter. All documents that the CPR system has generated for the encounter based on the information recorded in the patient's chart can be listed. Each listing has a printer icon to the left so that providers can choose to print a document if desired. The Document Name 212 that is highlighted in the list is displayed. If the provider has chosen to hold the chart instead of signing it and ending the encounter, the Sign-off screen 210 will display the tools for holding a chart. The chart can be locked on the current computer by filling in the appropriate check box and can be held for any specific provider by picking from the Provider list 214 with the Search button 216. The provider who is logged on to the CPR system must enter their password in the Sign-off Password field 220 before the chart can be held or signed.

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Figure 22 shows the Encounter Note 154 with signature lines 222. The Encounter Note 154 that the CPR system generates contains information recorded in the patient's chart during the encounter and other information. For each provider who acted during the encounter, the CPR system places a numbered signature line 222 on the bottom of the Encounter Note 154. Throughout the Encounter Note 154, superscripted numbers that correspond to the numbered signature lines can be placed next to items. By comparing the numbers on the signature lines 222 with the superscripted numbers throughout the Encounter Note 154, a reader of the Encounter Note 154 can determine

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which acting provider was responsible for which information in the Encounter Note 154.

The CPR system can generate documents based on the information recorded for a patient during each encounter. The Encounter Note 154, which is a SOAP note accessible through the SOAP tab 64, can be generated for each encounter. It details the history and physical information taken during the exam, the medical service provider's assessment and plan, and other encounter-specific information. Depending on the kind of information recorded for an encounter, the CPR system can also generate patient instructions, cover letters to consulting medical service providers, reports for lab, radiology, and referral orders, prescriptions, and reports tied to individual Visit Outlines. Figure 23 shows another type of signoff report, a Prescription note 224.

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Figure 24 shows a locked chart 230. The lock chart function allows a provider to leave an active encounter on a specific CPR system client computer. Any user can unlock the chart by entering their user name and password into the name field 12 and password field 14, respectively, but unauthorized persons cannot access the CPR system. When a locked chart 230 is unlocked by a different provider, the CPR system logs the previous provider out of and logs the new provider into the CPR system. For example, locking a chart allows a provider to leave an open encounter in an exam room with a patient. Another provider can then enter the exam room later, conveniently pick up the chart where it was left off, and finish the encounter.

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Figure 25 is a flowchart that demonstrates the way a medical service provider and staff can use the CPR system to guide and document a simple patient encounter. The first portion 300 of the method diagrammed in Figure 25

is a standard log-in procedure involving the steps of logging in 302 and opening a chart 303. The Log-in screen 10 is shown in Figure 1. The chart can be either an existing encounter chart selected through the Patient List screen 40 or a blank chart created using the Add New Patient button 44 shown in Figure 3.

The second portion 310 of the method can typically be carried out by a nurse. This portion of the method includes the Summary screen 50 data entry. This is useful for reviewing and updating information pertaining to the S and O portion of the SOAP format. Specifically, the steps include Recording Vital Signs 311 as shown in Figure 7, Selecting a Reason for the Patient Visit 312 as shown in Figure 4, Reviewing and Updating the Patient Problem list 313, Reviewing and Updating the Allergies/Alerts section 314, Reviewing and Updating the Medication Summary list 315, all as shown in Figure 7, and Holding or Locking the chart 316 as shown in Figures 21 and 24. The step of holding or locking the chart 316 is not necessary if the same person will continue the patient examination. This is also true for the step of Logging Out 317, which is optional.

The first portion 300 is only repeated to unhold or unlock the chart if the chart is held or locked at the end of the second portion 310 of the method. If the chart has been held or locked the next provider logs in and opens the chart for data entry. As noted, this portion does not need to be performed if the chart is not held or locked after completion of the second portion 310.

The third portion 330 includes utilizing the History and Physical Exam screen 110. This is generally where the provider is a physician. Complaint specific information is entered into a database via the History and Physical Examination screen 110. These steps are illustrated in Figures 8 through 13.

The fourth portion 350 includes utilizing the Order Entry screen 180. In this portion, the medical care provider reviews any other relevant data in the medical record. Specifically, the steps include: Adding Assessments 351 as shown in Figures 14 through 16, Recording Impressions 352 as shown in Figure 20, and Selecting Tests and Procedures 353, and Selecting Referrals 354 as shown in Figure 20. Additional steps include, Setting Follow-Up Appointments 356 also shown in Figure 20. If necessary, the step of Ordering Medications 356 can be added as shown in Figures 19.

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The fifth portion 370 includes the steps of Reviewing the Information entered 371, and Signing 372 or Holding 373 the chart as shown in Figure 20. It further includes a print option 374. The session can be ended by Logging Out 375 of the CPR system.

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In a second embodiment of the invention, the medical data-entry system integrates a carepath into the patient encounter. A carepath is a document that expresses best practices for the treatment of a disease at all stages in the course of the disease. Carepaths are sometimes represented as flow charts with decisions based on disease-state information. Carepaths require physician judgment to evaluate decisions. When translated for use in the CPR system, carepaths are made precise by formulating the decisions so that they can all be answered from data collected by the CPR system. Where physician judgment is required, the physician response is recorded as structured data that can be evaluated to track the carepath. Carepaths are not stipulated by the CPR system, but by the medical facility using the system.

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The CPR system can incorporate an engine for navigating carepaths. Based on disease information entered in the CPR system, carepaths make

detailed suggestions for care. The National Comprehensive Cancer Network Breast Cancer guidelines are an example of a carepath and can be used to assist a medical service provider treating a patient for breast cancer.

5 A patient is seen by a medical service provider for one or more reasons. Each reason has an associated template called a Visit Outline. Each Visit Outline may invoke one or more carepath. The medical service provider gathers data from the patient and enters it into the current encounter using a Visit Outline on the History and Physical screen 110. When the data is
10 entered, the medical service provider presses the Order Entry tab 54 to switch to the Order Entry screen 180. If any carepaths can be associated with any of the Visit Outlines in use, the carepaths run when the Order Entry screen 180 is requested. If the carepaths determine that data which should have been entered and which is needed to evaluate the carepath rules is missing, it asks
15 the physician to enter the data before switching to the Order Entry screen 180, and it identifies the missing data. When all the data is available, the carepath runs until it blocks or exits, placing suggestions for diagnoses, tests and procedures, referrals, and medications on the Order Entry screen 180.

20 There need not be any change to the graphical user interface when a carepath is used. Whether a carepath is used or not, the medical service provider enters subjective and objective data on the History and Physical screen 110 and then switches to the Order Entry screen 180 to enter an assessment and build a plan. The carepath enters suggestions for the
25 assessment and the plan on the Order Entry screen 180. Carepaths can be as detailed as necessary to ensure the best practices are followed when treating complex diseases or that all patients get appropriate wellness screenings.

The CPR system also provides for a special set of carepaths called wellness rules. Wellness rules are utilized when an encounter chart is opened and the suggested orders can be placed both on the Order Entry screen 180, and in the wellness section of the Summary screen 50. The CPR system's
5 implementation of wellness can evaluate a patient's status against the current set of wellness rules each time that the chart is opened. Wellness rules are not stipulated by the CPR system, but by the medical facility using the system.

The carepath mechanism is preferably integrated so that a medical
10 service provider need not be aware of whether there is a carepath associated with the reason this patient is being seen. If a carepath is associated with the reason for visit, the CPR system compares the data entered during the encounter to the carepath when the medical service provider presses the Order Entry tab 32. After examining the data, the carepath can request additional
15 data or offer suggestions.

The CPR system can perform the same function regarding wellness checks as it does for carepaths. Based on wellness criteria applied by the CPR system to existing patient data when their chart is opened, the CPR system can
20 suggest orders for the patient. Wellness checks can be coupled to age, sex, specific problem list entries, or medications. For example, a patient on Depakote® from Abbott Laboratories (Abbott Park, IL) may require frequent liver function checks; if the patient currently being seen is on Depakote® and has not recently had a liver function test, the CPR system can recommend the
25 test to the physician.

The CPR system can contain a rule interpreter that:

1. determines whether all data which should be available to determine the disease state has been entered, and if not, requests it;
2. evaluates a condition based on the disease state and possibly other data in the medical record;
3. if the condition is false, determines the next rule;
4. if the condition is true;
 - a. determines what diagnoses and orders to suggest, if any;
 - b. determines whether to stop or go on to another rule.

These rules can be expressed using three types of nodes—decision nodes, order nodes, and non-blocking order nodes.

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The CPR system presents a group practice's medical knowledge in a way that encourages consistent care from patient to patient and from physician to physician. Standards for the practice of medicine can be set by the practice group. All medical knowledge can be maintained externally to the CPR system and can be modified without change to the program. The CPR system can incorporate patient-tailored instructions that a medical practice can link to diagnoses or orders. For example, if a patient were scheduled for a blood test that required certain dietary restrictions, the patient tailored instruction could explain this. Similarly, instructions for disease management and medication dosages can be incorporated. The CPR system provides a set of tools for authoring the medical knowledge. Based on these customized algorithms, the CPR system can suggest procedures, labs, referrals, or medications by looking at existing information in the patient's record. When the chart is opened, the

CPR system can run any algorithms available and displays any resulting suggestions.

Another aspect of the CPR system is that it can maintain a provider
5 workspace that is outside any particular patient chart. In addition to providing
access to patient charts and other system-wide concepts, such as the formula
language tool, the workspace can keep task lists for individual providers. The
content of these task lists is sensitive to the provider who is logged on to the
CPR system and only tasks that can be assigned to that provider are presented.
10 To create these task lists, the CPR system can cull pertinent items from patient
records.

The provider workspace maintains task lists of, as examples,
outstanding orders, lab and radiology results that need to be reviewed,
15 consultation reports that need to be reviewed, and entire charts that require the
provider's attention. Also, the CPR system can list messages for the provider
and displays the provider's schedule.

Information recorded by the CPR system is self-describing; that is, the
20 structure of data is carried with the data. This allows all data for a patient to be
stored in a single file, regardless of the structure originally used to record it,
and allows the CPR system to correctly interpret data whose structure has been
superseded by a more recent structure. Data recorded with the CPR system is
valid no matter when it was recorded or which version of the program is
25 interpreting it. The CPR system preferably stores the data for a particular
patient in a single, concatenated file. Once a portion of the file is written it
need not be overwritten. Instead, updates can be appended to the end of the
file. In addition to performance advantages, there can be other advantages to
this architecture. The CPR system stores each patient's record independently

For performance reasons, certain large files need not be stored in the file containing a patient's record. Except for access to large external files, all access to patient records is local. Certain very large ancillary files, such as a digital x-ray images, can be kept in external files and a URL referencing the ancillary file can be kept in the main patient record. A digital x-ray image file reference, for example in the form of an Internet URL (one type of Internet address also known as a Uniform Resource Locator), would be stored in the record so that the x-ray image can be viewed as needed. Preferably, these files are not stored in the patient record to ensure fast download times for the patient file. The CPR system preferably keeps the size of a patient record file small to facilitate downloading it over slower connections or limited bandwidths, such as dial-up telephone lines. The ancillary files can be copied to the provider workstation when referenced.

As will be appreciated, the invention is capable of other and different embodiments, and is capable of modifications in various respects, all without

departing from the spirit of the invention. Accordingly, the drawings and description of the embodiments set forth above are to be regarded as illustrative in nature and not restrictive.

Claims:

1. A graphical user interface for medical data entry into a database, comprising:
 - a) a summary screen for entering summary information into the database;
 - b) a history and physical examination screen for entering history and physical examination information into the database; and
 - c) an order entry screen for entering order entry information into the database.
2. A graphical user interface as defined in claim 1 further comprising a plurality of tabs, each tab corresponding to a single screen and operative to display the corresponding single screen when selected.
3. A computer implemented medical data entry system comprising a database and a graphical user interface including:
 - a) a Summary screen for entering summary information into the database;
 - b) a history and physical examination screen for entering history and physical examination information into the database; and
 - c) an order entry screen for entering order entry information into the database.
4. A system as defined in claim 3 wherein the graphical user interface further includes means for selecting a single screen to be displayed.
5. A computer implemented method of generating a graphical user interface for documenting a patient encounter, the method comprising:

- a) providing a computer having a display;
 - b) generating a graphical user interface on the display, wherein the graphical user interface includes a first screen for entry of summary patient information, a second screen for entry of history and physical examination information, and a third screen for entry of order information;
 - c) entering a diagnosis via the graphical user interface; and
 - d) selecting a treatment in response to the entered diagnosis.
6. A method as defined in claim 5 further comprising
- e) selecting a prescription in response to the selection of the treatment.
7. A system to facilitate compliance with a carepath comprising:
- a) a computer system having a memory capable of storing patient information in a first datafile and carepath regimen information in a second datafile;
 - b) software operative to receive patient information, to compare the patient information with the carepath regimen information, and to suggest a carepath regimen compliant treatment.
8. A system as defined in claim 7 wherein the first datafile is a single concatenated file.
9. A computer-readable storage medium including computer executable code for carrying out the steps of:
- a) providing a database containing a plurality of predetermined diagnoses that correspond to carepath compliant treatments;
 - b) accessing the database;
 - c) entering a patient diagnosis into the database;

- d) matching the patient diagnosis to one of the predetermined diagnoses to determine the corresponding carepath compliant treatment; and
 - e) suggesting a carepath compliant treatment.
10. A computer-readable storage medium including computer executable code for carrying out the steps of:
- a) accessing a database containing patient information;
 - b) displaying the patient information;
 - c) entering additional patient information and a diagnosis to the database via a three screen graphical user interface;
 - d) selecting a treatment in response to the diagnosis.
11. A medium as defined in claim 10 wherein the three-screen graphical user interface includes a Summary screen, a History and Physical Exam screen, and an Order Entry screen.
12. A medium as defined in claim 10 wherein the code is further for:
- e) comparing the patient information to a database including carepath information.
13. A medium as defined in claim 10 wherein the code is further for:
- f) scheduling follow up appointment dates in response to the selection of the treatment.
14. A medium as defined in claim 10 wherein the code is further for:

g) suggesting a procedure in response to the entry of the diagnosis.

15. A medium as defined in claim 10 wherein the code is further for:

h) retrieving patient files stored in a remote location in response to the access of the database.

16. A computer implemented system having a memory, a display, and a computer operative to generate a graphical user interface on the display, the graphical user interface comprising:

a. a display view including a plurality of representations grouped into:

- i. a summary group including representations having an input window operative to receive summary information;
- ii. a history/physical exam group including representations having an input window operative to receive history/physical exam information; and
- iii. an order entry group including representations having an input window operative to receive order entry information; and

b. a plurality of tabs, each tab corresponds to a single representation group, and responds to selection of the tab by displaying the corresponding representation group.

17. A system as defined in claim 16 wherein the display view further includes an icon that responds to selection by opening a pop-up input window.

18. A system as defined in claim 16 wherein the summary information is selected from the group consisting of vital signs, complaint, reason(s) for visit, problem history, allergies, alerts, medication history, and combinations thereof.

19. A system as defined in claim 16 wherein the history/physical exam information is selected from the group consisting of complaint specific information, and observations.

20. A system as defined in claim 16 wherein the order entry information is selected from the group consisting of assessments, impressions, tests, procedures, referrals, follow-up dates, prescriptions, and combinations thereof.

21. A method comprising:

- a) logging into a computer connected to a network;
- b) opening a graphical user interface on the computer, the graphical user interface having a summary screen, a history and physical examination screen, and an order entry screen operative to input data into a database;
- c) recording vital signs and a complaint into the summary screen on the computer;
- d) reviewing a patient problem list displayed on the summary screen;
- e) updating the patient problem list displayed on the summary screen;
- f) reviewing a patient allergies and alerts list displayed on the summary screen;

- g) updating the patient allergies and alerts displayed on the summary screen;
- h) reviewing a patient medication summary displayed on the summary screen;
- i) updating the patient medication summary displayed on the summary screen;
- j) holding or locking the graphical user interface for use by a physician;
- k) unholding or unlocking the graphical user interface by the physician;
- l) reviewing updated summary information displayed on the summary screen;
- m) entering complaint specific information during a history and physical examination via the history and physical examination screen;
- n) making a patient assessment in response to the history and physical examination;
- o) recording impressions of the patient via the order entry screen;
- p) selecting tests, referrals, follow-up appointments, and procedures in response to the patient impressions recorded on the order entry screen;
- q) recording patient goals via the order entry screen;
- r) making medication orders via the order entry screen;
- s) reviewing patient instructions, laboratory and radiology orders, and prescriptions that are displayed on an encounter note displayed on the order entry screen;
- t) signing the encounter note.

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(19) World Intellectual Property Organization
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60/154,305 16 September 1999 (16.09.1999) **US**

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[Continued on next page]

(54) Title: **COMPUTER BASED PATIENT RECORD MANAGEMENT SYSTEM AND METHOD**

(57) Abstract: The present invention provides a comprehensive computerized patient record (CPR) system including a graphical user interface (50) with a three-screen organization method. The method organizes the medical data entry to conform with the way that medical care providers are trained to gather and evaluate data. The present invention also includes the integration of the patient encounter and medical data entry (90) with user customizable Visit Outlines (84), Order Sets, carepath regimens, wellness guides (74), or the like.



(84) **Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— *With international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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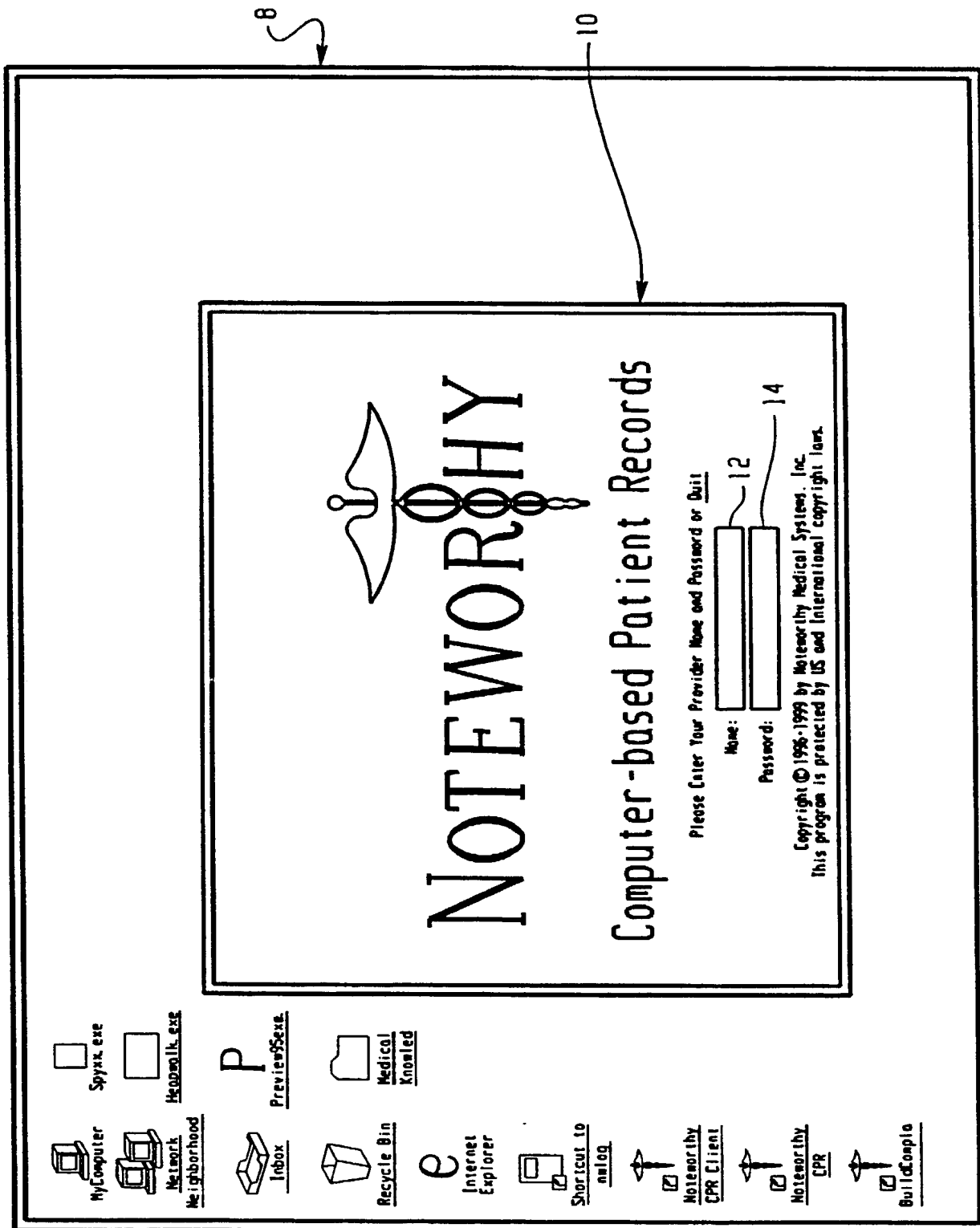


Fig. 1

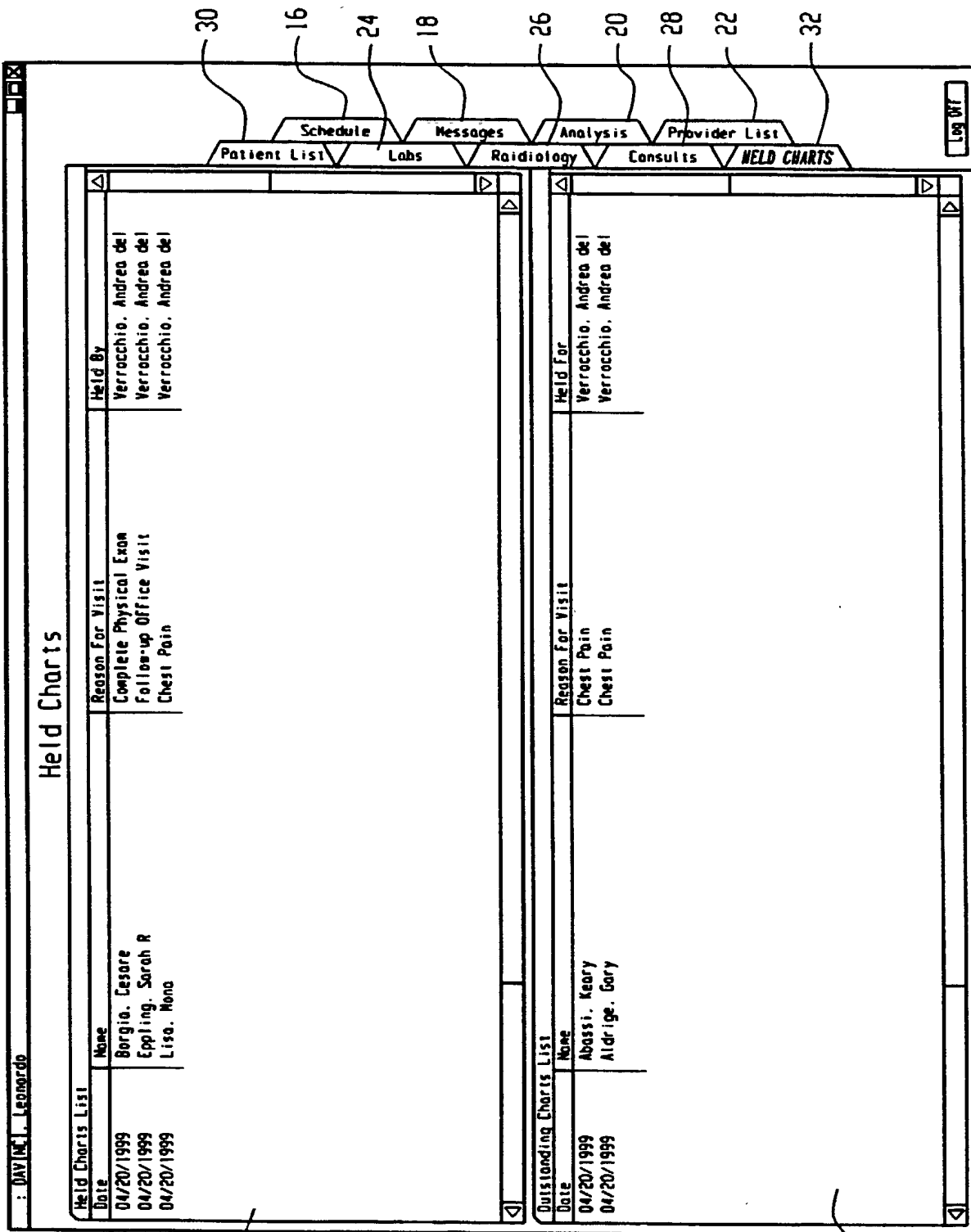


Fig. 2

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Patient List

Clinic ID	Patient	Work #	Home #	Fax #	Primary Care Physician	Soc Secur ID	Date of Birth
36856127	Ballinger, Mabel H	(###)###-####	(###)###-####		Leonardo Davinci	000-00-0000	December 17, 1948
47985174	Baltimore, Abigail G	(###)###-####	(###)###-####		Titian	000-00-0000	May 5, 1976
29886147	Baltimore, Jasmine L	(###)###-####	(###)###-####		Raphael	000-00-0000	May 13, 1955
98071573	Baltzer, Annette U	(###)###-####	(###)###-####		Michelangelo	000-00-0000	September 17, 1919
61010963	Baltzer, Rana D	(###)###-####	(###)###-####		Michelangelo	000-00-0000	November 22, 1987
91116749	Banas, Blossom L	(###)###-####	(###)###-####	FFFF IFFF-FFFF	Raphael	000-00-0000	September 10, 1954
60105050	Banas, Patience H	(###)###-####	(###)###-####		Leonardo Davinci	000-00-0000	September 27, 1971
89994718	Bane, Clover E	(###)###-####	(###)###-####		Titian	000-00-0000	April 7, 1984
12998674	Bane, Leroy Y	(###)###-####	(###)###-####		Michelangelo	000-00-0000	January 6, 1993
78667266	Banfield, Marta V	(###)###-####	(###)###-####	FFFF IFFF-FFFF	Michelangelo	000-00-0000	September 23, 1917
22900694	Banfield, Paxon L	(###)###-####	(###)###-####		Raphael	000-00-0000	June 25, 1953
47985174	Barajas, Eda A	(###)###-####	(###)###-####	FFFF IFFF-FFFF	Leonardo Davinci	000-00-0000	May 31, 1951
29886147	Barajas, Vandyke M	(###)###-####	(###)###-####		Leonardo Davinci	000-00-0000	October 15, 1949
98071573	Barbee, Connie B	(###)###-####	(###)###-####		Titian	000-00-0000	May 17, 1995
61010963	Barbee, Patric K	(###)###-####	(###)###-####		Leonardo Davinci	000-00-0000	May 30, 1959
91116749	Barber, Dylan C	(###)###-####	(###)###-####	FFFF IFFF-FFFF	Leonardo Davinci	000-00-0000	April 28, 1990
60105050	Barber, Raleigh L	(###)###-####	(###)###-####		Titian	000-00-0000	July 1, 1946
89994718	Barben, Ateleie M	(###)###-####	(###)###-####		Raphael	000-00-0000	June 11, 1978
12998674	Barben, Iva F	(###)###-####	(###)###-####		Raphael	000-00-0000	September 28, 1957
78667266	Barbell, Clarissa A	(###)###-####	(###)###-####		Leonardo Davinci	000-00-0000	February 27, 1916
22900694	Barbell, Frederick V	(###)###-####	(###)###-####	FFFF IFFF-FFFF	Titian	000-00-0000	January 14, 1973
60105050	Barker, Julia H	(###)###-####	(###)###-####		Michelangelo	000-00-0000	September 9, 1950
89994718	Barker, Talia K	(###)###-####	(###)###-####		Leonardo Davinci	000-00-0000	January 9, 1918
12998674	Barkley, Mandisa U	(###)###-####	(###)###-####		Leonardo Davinci	000-00-0000	June 23, 1907
78667266	Barkley, Tesla X	(###)###-####	(###)###-####	FFFF IFFF-FFFF	Titian	000-00-0000	October 12, 1930
22900694	Barlow, Biddy R	(###)###-####	(###)###-####		Raphael	000-00-0000	April 18, 1932
47985174	Barlow, Janelle R	(###)###-####	(###)###-####		Michelangelo	000-00-0000	March 7, 1963
29886147	Barnes, Dion J	(###)###-####	(###)###-####		Michelangelo	000-00-0000	March 2, 1924
98071573	Barnes, Dulcia T	(###)###-####	(###)###-####		Titian	000-00-0000	March 12, 1933
61010963	Barnett, Lucia R	(###)###-####	(###)###-####		Raphael	000-00-0000	May 25, 1915
91116749	Barnett, Maisie V	(###)###-####	(###)###-####		Michelangelo	000-00-0000	July 9, 1967
60105050	Barnhouse, Susie I	(###)###-####	(###)###-####		Michelangelo	000-00-0000	April 23, 1927
89994718	Barnhouse, Zel S	(###)###-####	(###)###-####	FFFF IFFF-FFFF	Michelangelo	000-00-0000	July 30, 1970
12998674	Barone, April H	(###)###-####	(###)###-####		Leonardo Davinci	000-00-0000	July 7, 1910
78667266	Barone, Dinah V	(###)###-####	(###)###-####		Raphael	000-00-0000	January 20, 1973
22900694	Barr, Belinda B	(###)###-####	(###)###-####		Leonardo Davinci	000-00-0000	November 6, 1993

Fig. 3

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10,070,981

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Patient Chart - LISA/Mona LISA, Mona

52 53 54 84

70 50 72 74

SUMMARY His and PE Order Entry Reasons For Visit: Add....

Primary Provider: Leonardo DaVinci, (216) 299-3838

Chief Complaint

Vital Signs

Hgt	Wgt
Bp	Pulse
Temp	Resp
Age	Sex
49 years	F

Problem List

Onset	Status	Problem
10/07/1998	Active	UNSPECIFIED CHEST PAIN

Allergies/Alerts

Date	Status	Allergy	Notes
02/09/1999	Active	Federal	
04/20/1999	Active	penicillin g	Gets a severe rash

Current Medications as of April 20, 1999

Dx	Date	Status	Name	Sig
L0	10/07/1998	Active	Indur, 30mg (tab. sr 24h)	TAKE ONE TABLET EACH MORNING
L0	10/07/1998	Active	Pepcid, 40mg (tablet)	PRN

Wellness

Due Date	Status	Wellness Check
04/20/1999	Due	Mammogram (Screening Mammogram)
04/20/1999	Due	Mammogram (monthly self exam)

Events

Date	Status	Event
02/09/1999	Closed	Chest Pain
10/10/1998	Closed	Office Visit
10/09/1998	Closed	Review of Lab 80172 Gold
10/09/1998	Closed	Lab 80172 Gold
10/07/1998	Closed	Chest Pain
08/19/1998	Closed	Review of Lab 80172 Gold
08/19/1998	Closed	Lab 85050 Urinary/biochemistry ab externo

Fig. 4

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Patient Chart - LISA, Mona				SUMMARY		Hx and PE		Order Entry		Reasons for Visit: Chest Pain Add...		LISA, Mona																																																						
Vital Signs <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Hgt</td> <td style="width: 25%;">5 ft 5 in</td> <td style="width: 25%;">Wgt</td> <td style="width: 25%;">126 lb</td> </tr> <tr> <td>BP</td> <td>120/80</td> <td>Pulse</td> <td></td> </tr> <tr> <td>Temp</td> <td>98.6 F</td> <td>Resp</td> <td></td> </tr> <tr> <td>Age</td> <td>49 years</td> <td>Sex</td> <td>F</td> </tr> </table>				Hgt	5 ft 5 in	Wgt	126 lb	BP	120/80	Pulse		Temp	98.6 F	Resp		Age	49 years	Sex	F	Primary Provider: Leonardo DaVinci, 12151 299-3838 Chief Complaint: Chest Pain 3 days				SOAP <div style="border: 1px solid black; height: 40px; width: 100%;"></div>				Time Line <div style="border: 1px solid black; height: 40px; width: 100%;"></div>		Anal <div style="border: 1px solid black; height: 40px; width: 100%;"></div>		Lab <div style="border: 1px solid black; height: 40px; width: 100%;"></div>																																		
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Age	49 years	Sex	F																																																															
Problem List <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Onset</th> <th>Status</th> <th>Problem</th> </tr> <tr> <td>10/07/1998</td> <td>Active</td> <td>UNSPECIFIED CHEST PAIN</td> </tr> </table>				Onset	Status	Problem	10/07/1998	Active	UNSPECIFIED CHEST PAIN	Allergies/Allerts <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Date</th> <th>Status</th> <th>Allergy</th> </tr> <tr> <td>02/09/1999</td> <td>Active</td> <td>Febrol</td> </tr> <tr> <td>04/20/1999</td> <td>Active</td> <td>penicillin g</td> </tr> </table>				Date	Status	Allergy	02/09/1999	Active	Febrol	04/20/1999	Active	penicillin g	Notes Gets a severe rash																																											
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04/20/1999	Active	penicillin g																																																																
Current Medications as of April 20, 1999 <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Dr.</th> <th>Date</th> <th>Status</th> <th>Name</th> <th>Siq</th> </tr> <tr> <td>LD</td> <td>10/07/1998</td> <td>Still Taking</td> <td>Indur, 30mg (tab sr 2th)</td> <td>TAKE ONE TABLET EACH MORNING</td> </tr> </table>				Dr.	Date	Status	Name	Siq	LD	10/07/1998	Still Taking	Indur, 30mg (tab sr 2th)	TAKE ONE TABLET EACH MORNING	Medications <div style="border: 1px solid black; padding: 5px;"> Search Fe 50 Clear List </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Name</th> <th>Dosage</th> <th>Form</th> </tr> </thead> <tbody> <tr><td>Febatol</td><td>600mg/5ml</td><td>oral susp</td></tr> <tr><td>Febatol</td><td>400mg</td><td>tablet</td></tr> <tr><td>Febatol</td><td>600mg</td><td>tablet</td></tr> <tr><td>Febatol</td><td>10mg</td><td>capsule</td></tr> <tr><td>Feldene</td><td>20mg</td><td>capsule</td></tr> <tr><td>Feldene</td><td>325-40-50</td><td>tablet</td></tr> <tr><td>Febutol</td><td>325-40-50</td><td>capsule</td></tr> <tr><td>Fecet</td><td></td><td>tablet</td></tr> <tr><td>Feminine Formula Iron</td><td></td><td>tablet</td></tr> <tr><td>Fairiron Multi-Vitamins and Iron</td><td></td><td>tablet</td></tr> <tr><td>Fenoprofen Calcium</td><td></td><td>tablet</td></tr> <tr><td>Fenoprofen Calcium</td><td></td><td>tablet</td></tr> <tr><td>Feosol</td><td></td><td>powder</td></tr> <tr><td>Feosol</td><td></td><td>tablet</td></tr> </tbody> </table>								Name	Dosage	Form	Febatol	600mg/5ml	oral susp	Febatol	400mg	tablet	Febatol	600mg	tablet	Febatol	10mg	capsule	Feldene	20mg	capsule	Feldene	325-40-50	tablet	Febutol	325-40-50	capsule	Fecet		tablet	Feminine Formula Iron		tablet	Fairiron Multi-Vitamins and Iron		tablet	Fenoprofen Calcium		tablet	Fenoprofen Calcium		tablet	Feosol		powder	Feosol		tablet
Dr.	Date	Status	Name	Siq																																																														
LD	10/07/1998	Still Taking	Indur, 30mg (tab sr 2th)	TAKE ONE TABLET EACH MORNING																																																														
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Febutol	325-40-50	capsule																																																																
Fecet		tablet																																																																
Feminine Formula Iron		tablet																																																																
Fairiron Multi-Vitamins and Iron		tablet																																																																
Fenoprofen Calcium		tablet																																																																
Fenoprofen Calcium		tablet																																																																
Feosol		powder																																																																
Feosol		tablet																																																																
Wellness <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Due Date</th> <th>Status</th> </tr> <tr> <td>04/20/1999</td> <td>Due</td> </tr> </table>				Due Date	Status	04/20/1999	Due	Please SELECT from 56 items <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>08/19/1998</td> <td>Closed</td> <td>Review of Lab 80172 Gold</td> </tr> <tr> <td>08/19/1998</td> <td>Closed</td> <td>Lab 85850 Trabeculotomy ab externo</td> </tr> </table>				08/19/1998	Closed	Review of Lab 80172 Gold	08/19/1998	Closed	Lab 85850 Trabeculotomy ab externo	Sign Chart <div style="border: 1px solid black; height: 40px; width: 100%;"></div>																																																
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08/19/1998	Closed	Review of Lab 80172 Gold																																																																
08/19/1998	Closed	Lab 85850 Trabeculotomy ab externo																																																																

Fig. 5

Fig. 6

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52 53 54 84

Patient Chart - LISA, Mono

SUMMARY Hx and PE Order Entry

Reasons For Visit: Chest Pain Add----

Primary Provider: Leonardo DeVinci, (216) 299-2838

Vital Signs

Hgt	5 Ft 5 in	Wgt	126 lb
BP	120/80	Pulse	
Temp	98.6 F	Resp	
Age	49 years	Sex	F

Problem List

Onset	Status	Problem
10/07/1998	Active	UNSPECIFIED CHEST PAIN

Chief Complaint

Chest Pain 3 days

Allergies/Alerts

Date	Status	Allergy	Notes
02/09/1999	Active	Febrol	
04/20/1999	Active	penicillin g	Gets a severe rash

Current Medications as of April 20, 1999

Dr.	Date	Status	Medication	Sig
LD	04/20/1999	Started Taking	FeSO ₄ 160mg (tablet sa)	
LD	10/07/1998	Still Taking	Indur. 30mg (tab. sr 24h)	TAKE ONE TABLET EACH MORNING
LD	10/07/1998	Still Taking	Pepcid. 40mg (tablet)	PRN

Events

Date	Status	Event
02/09/1999	Closed	Chest Pain
10/10/1998	Closed	Office Visit
10/09/1998	Closed	Review of Lab 80172 Gold
10/09/1998	Closed	Lab 80172 Gold
10/07/1998	Closed	Chest Pain
08/19/1998	Closed	Review of Lab 80172 Gold
08/19/1998	Closed	Lab 85850 Trabeculotomy ab externo

Wellness Check

Due Date	Status	Wellness Check
04/20/1999	Due	Mammogram (Screening Mammogram)
04/20/1999	Due	Mammogram (Monthly self exam)

SOAP **Time Line** **Analysis** **Data Sheets** **All**

SOAPS **Labs** **Radiology** **Medications** **Consults**

Sign Out **Hold Chart For**

70 50 72 74 88 64 56 24 58 26 60 66 62 28

Fig. 7

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116 Patient Chart - LISA, Mona

52 Summary 53 HX AND PE 54 Order Entry 55 Add...

84 Chest Pain 118

88 (Patient Photo)

64 SOAP 56 Time Line 24 Labs 58 Analysis 26 Radiology 60 Data Sheets 66 Medications 62 All 28 Consults

112

114

142

138

112

114

142

138

Open: ☐ All ☒ Auto ☐ Navigate Insert 30

Open: ☐ All ☒ Auto ☐ Navigate Insert 30

110

Fig. 8

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Top Navigation Bar: Summary (52), HX AND PE (53), Order Entry (54), Reasons for Visit (55), Add (118)

Left Sidebar (Patient History):

- Item: CHEST PAIN (122)
- Duration: 1 (120)
- Onset: 1 (120)
- Nature of Pain: 1 (120)
- Radiation: 1 (120)
- Pattern: 1 (120)
- Aggravating Factors: 1 (120)
- Ameliorating Factors: 1 (120)
- Associated Symptoms: 1 (120)
- Description of Normal Exercise Tolerance: 1 (120)
- Description of Current/Recent Exercise Tolerance: 1 (120)
- History of Cardiac Disease/Dysfunction: 1 (120)
- Relevant Post Medical History: 1 (120)
- Risk Factors / Exposures: 1 (120)

Main Content Area:

Physical Examination (110)

Item: CHEST PAIN (112)

Value: --END-- (114)

Item: CHEST PAIN (112)

Value: --END-- (114)

Right Sidebar (Examination):

- Item: CHEST PAIN (138)
- Value: --END-- (142)
- Open: O All (148)
- Auto (148)
- Navigate (148)
- Insert 2 (148)
- Note (148)
- All Normal (148)

Bottom Navigation Bar: SOAP (56), Time Line (58), Labs (60), Analysis (62), Data Sheets (64), All (66), Consults (68)

Top Bar: LISA, Mona (88)

Bottom Bar: Sign Chart (84), Hold Chart (84)

Fig. 9

10/25

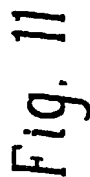
1070981

Figure 10 is a screenshot of a medical charting software interface titled "LISA, Mona". The interface is divided into several sections:

- Header:** "Patient Chart - LISA, Mona" with a "Summary" tab selected.
- Reasons for Visit:** A dropdown menu showing "Chest Pain".
- Main Content Area:**
 - Left Pane (Patient History):** A list of medical history items with checkboxes and radio buttons. Items include:
 - Onset
 - Nature of Pain (Generalized Location(s), Radiation, Pattern, Aggravating Factors, Alleviating Factors)
 - Associated Symptoms
 - Description of Normal Exercise Tolerance
 - Description of Current/Recent Exercise Tolerance
 - History of Cardiac Disease/Dysfunction
 - Cardiac Event #1
 - Type of Cardiac Disease/Dysfunction
 - Approximate Date When Problem Began
 - Is This an Ongoing Problem?
 - Work-up for This Problem
 - Intervention for This Problem
 - Location of These Medical Records
 - Additional Comments
 - Add an Additional Cardiac Event to PHH
 - Relevant Past Medical History
 - Risk Factors / Exposures
 - Right Pane (Physical Examination):** A list of physical exam items with checkboxes. Items include:
 - CHEST PAIN
 - Aspects of Exam That Were Conducted
- Navigation and Control:**
 - Buttons at the bottom: "Open: O All", "Auto", "Navigate", "Insert Z", "M Note", "All Normal".
 - Buttons at the top right: "Sign Chart", "Hold Chart for".

Fig. 10

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PCT/US0025209



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52 Patient Chart - LISA, Mona

53 Summary HX AND PE Order Entry

54 Reasons For Visit: Chest Pain Add...

84 LISA, Mona

88 (Patient Photo)

116 Patient History

122 CHEST PAIN

120 Duration: A few days

136 Onset: Chronic/Insidious

134 Nature of Pain: Dull

110 Diffuse

- Generalized (Location/s)
- Radiation
- Pattern
- Aggravating Factors
- Relieving Factors
- Associated Symptoms
- Description of Normal Exercise Tolerance
- Description of Current/Recent Exercise Tolerance
- History of Cardiac Disease/Dysfunction

112 Cardiac Event H.L.

- Type of Cardiac Disease/Dysfunction
- Appropriate Date When Problem Began
- Is this an Ongoing Problem?
- Work-up for this Problem
- Intervention for this Problem
- Location of these Medical Records
- Additional Comments
- Add on Additional Cardiac Event to PHH
- Relevant Post Medical History
- Risk factors / Exposures

--END--

Value

112 A few days

114 Chronic/Insidious

114 Dull

114 Diffuse

114 Generalized (Location/s)

114 Radiation

114 Pattern

114 Aggravating Factors

114 Relieving Factors

114 Associated Symptoms

114 Description of Normal Exercise Tolerance

114 Description of Current/Recent Exercise Tolerance

114 History of Cardiac Disease/Dysfunction

114 Cardiac Event H.L.

114 Type of Cardiac Disease/Dysfunction

114 Appropriate Date When Problem Began

114 Is this an Ongoing Problem?

114 Work-up for this Problem

114 Intervention for this Problem

114 Location of these Medical Records

114 Additional Comments

114 Add on Additional Cardiac Event to PHH

114 Relevant Post Medical History

114 Risk factors / Exposures

116 Physical Examination

122 Item

120 Value

136 Chest

134 Abdomen

110 Abnormalities

112 Bruises

114 Aortic

114 Location of Bruises

114 Lower Chest Quadrant

114 Left Upper Quadrant

114 Left Lower Quadrant

114 Right Upper Quadrant

114 Right Lower Quadrant

114 Anterior

114 Posterior

114 Lateral

114 Medial

114 Superior

114 Inferior

114 Proximal

114 Distal

114 Central

114 Peripheral

114 Medial

114 Lateral

114 Superior

114 Inferior

114 Proximal

114 Distal

114 Central

114 Peripheral

Value

112 Symmetrical Respiratory Effort, Even and Unlabored, Tactile Fremitus Within Normal Limits, Bilaterally, Clear to Auscultation and Percussion, Good Air Exchange, Normal C:1 Ratio, No Signs of Consolidation or Effusion

114 Head/Neck: Soft, No tenderness, No masses, No hepatomegaly, No shifting dullness of fluid wave, No CVA tenderness, No reactive bowel sounds

114 Abdomen: Soft, No tenderness, No masses, No hepatomegaly, No shifting dullness of fluid wave, No CVA tenderness, No reactive bowel sounds

114 Abnormalities: Bruises, Aortic

114 Location of Bruises: Lower Chest Quadrant

114 Left Upper Quadrant

114 Left Lower Quadrant

114 Right Upper Quadrant

114 Right Lower Quadrant

114 Anterior

114 Posterior

114 Lateral

114 Medial

114 Superior

114 Inferior

114 Proximal

114 Distal

114 Central

114 Peripheral

114 Medial

114 Lateral

114 Superior

114 Inferior

114 Proximal

114 Distal

114 Central

114 Peripheral

116 SOAP

122 Time Line

120 Analysis

136 Data Sheets

134 All

110 Consults

Value

112 SOAP

114 Time Line

114 Analysis

114 Data Sheets

114 All

114 Consults

116 Sign Out

122 Hold Chart For

Value

112 Sign Out

114 Hold Chart For

Fig. 12

13/25

Figure 13 is a screenshot of a medical software interface titled "Patient Chart - LISA, Mona". The interface is divided into several sections. At the top, there's a "Patient Photo" placeholder (88) and a navigation bar with tabs: "Summary", "HX AND PE", "Order Entry", "Reasons For Visit", "Add...", and "LISA, Mona". Below this, the "Patient History" section (116) contains a table with columns "Item" and "Value". The table lists various medical findings under the heading "CHEST PAIN", including duration, onset, nature of pain, radiation, pattern, aggravating factors, ameliorating factors, associated symptoms, description of normal exercise tolerance, description of current/recent exercise tolerance, history of cardiac disease/dysfunction, and cardiac event #1. The "Physical Examination" section (112) also contains a table with columns "Item" and "Value", listing findings for diastolic murmur, pattern, intensity, intensity increased/decreased by, radiates to, additional comments, chest, and abdomen. The interface includes a sidebar on the left with a "Patient Photo" placeholder (88) and a "Sign Chart" (28). The bottom of the interface features a navigation bar with buttons for "Open: O All", "Auto", "Navigate", "Insert Z 30", "H Note", "All Normal", and "Sign Chart".

Fig. 13

14/25

158

52 53 54 84 154

Patient Chart - LISA, Mona

Summary History and PE ORDER ENTRY Reasons for Visit: Chest Pain Add...

Encounters

- ☐ (08/17/1998) Chest Pain
- ☐ (08/19/1998) Lab 65850 Trob
- ☐ (08/19/1998) Lab 80172 Gold
- ☐ (08/19/1998) Review of Lab
- ☐ (10/07/1998) Chest Pain
- ☐ Gold
- ☐ (10/09/1998) 30mg Trob, sr 24h)
- ☐ (10/09/1998) 40mg, (tablets)
- ☐ (10/09/1998) Lab 80172 Gold
- ☐ (10/10/1998) Review of Lab
- ☐ (02/09/1999) Office Visit
- ☐ (02/09/1999) Chest Pain

LISA, Mona

Encounter Note: Chest Pain

Leonardo DaVinci, M.D.
Noteworthy Medical Systems, Inc.
11000 Cedar Ave. Suite 401
Cleveland, OH 44106
(XXX) XXX-XXXX x:108

October 7, 1998 9:04 AM

Lisa, Mona

DOB: June 16, 1969
Age: 40 years
Sex: F

Address: 123 West Main Street
Cleveland, OH 44106
Phone: (XXX) XXX-XXXX

Patient Photo

Subjective

CHEST PAIN

Duration	A Few Days
Onset	Chronic/Insidious
Nature of Pain	Dull.....
Diffuse...	Epigastric
Generalized Location(s)	None
Radiation	Occurs During Mild Activity
Pattern	Inspiration, Exertion
Aggravating Factors	Rest, Antacid use
Ameliorating Factors	Chills, Nausea
Associated Symptoms	Little or None
Description of Normal Exercise Tolerance	less
Description of Current/Recent Exercise Tolerance	less
History of Cardiac Disease/	Yes

Print Resopen Encounter

Time Line SOAP Labs Analysis Radiology Data Sheets Medications ALL Consults

Sign Out Hold Chart for

28 62 66 60 26 58 24 56 64

156

Fig. 14

15/25

52 53 54 84

Patient Chart - LISA/Mona

Summary Hb and PC ORDER ENTRY Reasons For Visit: Review of Lab 80172 Gold Add...

LISA, Mona

(Patient Photo) 88

64 56 24 58 26 60 66 62 28

SOAP Time Line Analysis Data Sheets All Sign Chart Held Chart for

LABS Radiology Medications Consults

Labs

All Labs			Labs Summary		
Date	Stat	CPT	CPT	Date	Count
08/19/1998	Normal	65850	69365	02/09/1999	0
08/19/1998	Normal	80172	80172	02/09/1999	3
10/07/1998	Normal	84228	84228	02/09/1999	2
10/07/1998	Abnormal	80172	25915	10/07/1998	1
10/07/1998	Normal	25915	65850	08/19/1998	1
02/09/1999	Received	84228			
02/09/1999	Normal	80172			
02/09/1999	Ordered	69365			

Lab Description	
Trabeculotomy ab externo	Water Load Test
Gold	Gold
Quinine	Quinine
Gold	Krukenberg procedure
Krukenberg procedure	Trabeculotomy ab externo
Quinine	
Gold	
Water Load Test	

162

164

160

Fig. 15

16/25

52 53 54 84 168 170 166

Patient Chart - LISA, Mona

Summary Hx and PE ORDER ENTRY

Reasons for Visit: Chest Pain Add....

Create Reports or Reports

Available Graphs

Available Graphs
Available Graphs
Cholesterol
Triglycerides
CK-MB
BP/Time
LO

Available Reports

Run Graph

Run Report

SOAP Time Line ANALYSIS Data Sheets All Consults

(Patient Photo)

Sign Out Hold Chart for

Export to DB Print

Fig. 16

17/25

1070981

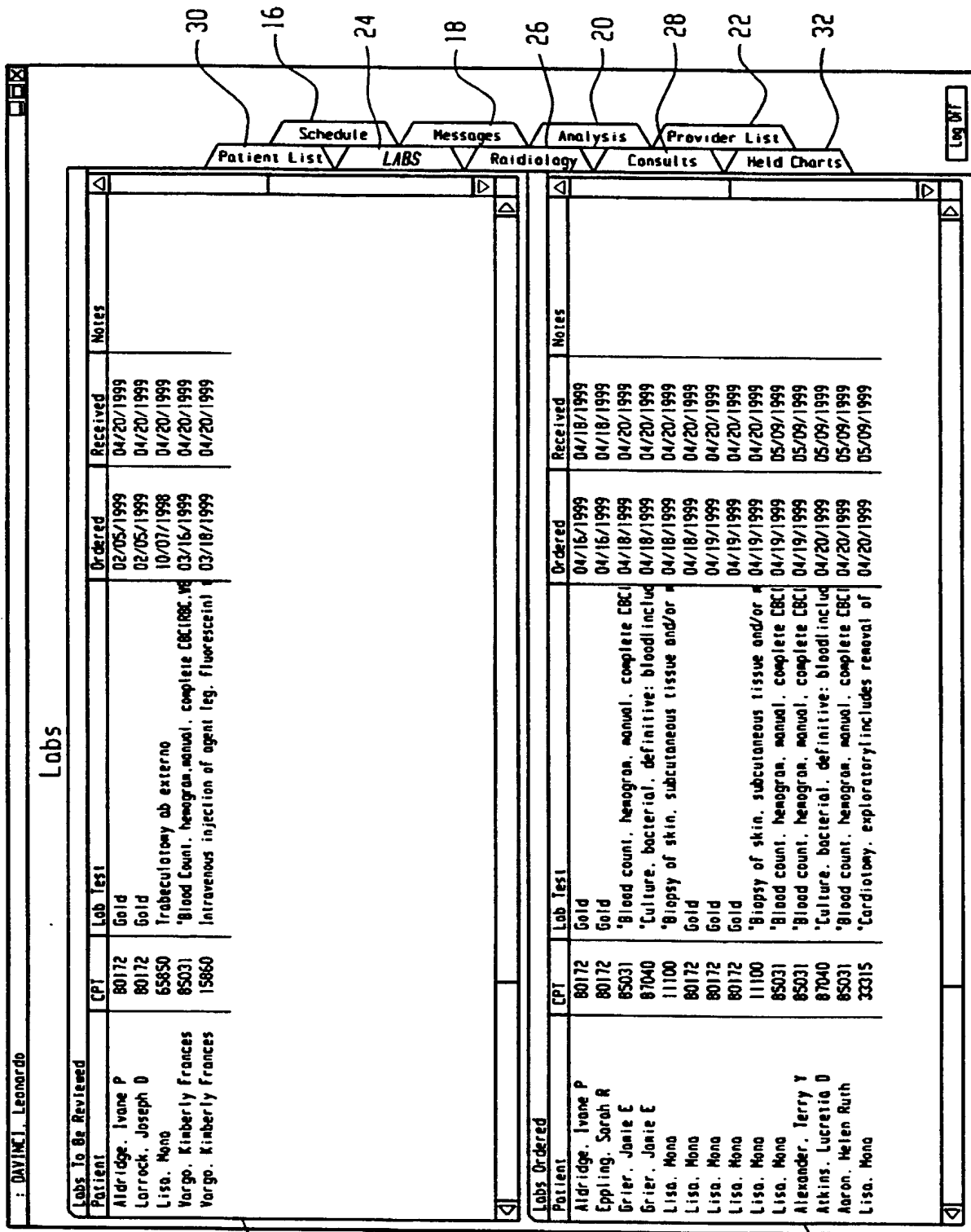


Fig. 17

18/25

52 53 54 84

Patient Chart - LISA, Mona

Summary Hx and PE ORDER ENTRY Reasons For Visit: Chest Pain Add...

LISA, Mona

88 (Patient's Photo)

64 SOAP 24 Time Line 56 Labs 58 Analysis 26 Radiology 60 Data Sheets 66 Medications 62 All 28 Consults

182

192

194

188

180

190

Fig. 18

Assessments	ICD	Diagnosis	Status	Impressions
Add				

Procedures/Labs/Radiology	CPT	Procedure/Labs/Rad	Status	Instructions
Add				
	76091	Mammography: bilateral		

Referrals	Referral	Reason	Status
Add			
	Monthly self exam		

Future Appointments	Interval	Reason	Status
Add			

Medications	DR	Date	Name	Sig	Action	Type	Quantity	Refills	First Ordered
M	04/20/1999	FeSO ₄ 160mg (tablet sal)	TAKE ONE TABLET EACH MORNING PRN	Started Taking	Rx	30	4	06/29/1999	
LO	10/07/1998	Indur 30mg (tab sr 24h)		Still Taking	Rx			06/29/1999	
LO	10/07/1998	Pepcid, 40mg (tablet)		Still Taking	Rx			06/29/1999	

Add

Clear Unselected Orders

10,070,981

19/25

52 53 54 84

Patient Chart - LISA, Mona

Summary History PE ORDER ENTRY Reasons for Visit: Chest Pain Add...

Assessments

ICD	Diagnosis	Status	Impressions
786.50	CHEST PAIN, UNSPECIFIED	Selected	

88 (Patient Photo)

182

188

196

180

190

198

204

200

202

Order

Quantity Refills Directions

12 1 Take as needed for chest pains

Complete...

Add New Order

Special Instructions

Pharmacy

Notes:

Started: [] Renewed: [] Stopped: []

Quantity Refills Directions

Prescribe: []

Reason Stopped: []

Was on effective []

Apply OK Cancel

Fig. 19

Diagram illustrating a medical software interface for a patient named Lisa Mona. The interface is divided into several sections:

- Summary:** Patient Chart - LISA, Mona; Hx and PE; Reasons for Visit: Chest Pain; Add...
- Assessments:** ICD Diagnosis: 706.50 UNSPECIFIED CHEST PAIN; Status: Impressions; Selected.
- Procedures/Labs/Radiology:**
 - 33315 Cardiotomy, exploratory (includes removal of foreign body); with cardiopulmonary bypass; Status: Selected; Instructions.
 - 76091 Mammography: bilateral.
- Referrals:**
 - Referral: Monthly self exam; Reason: Status: Selected.
 - Add.
- Future Appointments:**
 - Interval: PRN; Reason: Chest Pain; Status: Selected.
 - Add.
- Medications:**
 - DR: Date; Name; Sig; Action; Quantity; Refills; First Ordered.
 - L0 04/20/1999 Nitroglycerin, 6.5mg (capsule); Take as needed for chest pain; None; Started Taking; 12; 04/20/1999.
 - M 04/20/1999 Fe50, 160mg (tablet sol); TAKE ONE TABLET EACH MORNING; Rx; 30; 03/26/1999.
 - L0 10/07/1998 Indur 30mg (tab sr 24h); PRN; Rx; 4; 10/07/1998.
 - L0 10/07/1998 Pepcid, 40mg (tablet); PRN; Rx; 10/07/1998.
- Navigation Bar:** SOAP, Time Line, Analysis, Data Sheets, All, Sign Chart, Held Chart for.

Fig. 20

The following orders and reports have been generated. Please review them by selecting them from the list:
check the boxes for those that you would like to print.

Print?	Document Name
<input checked="" type="checkbox"/>	SOAP Note
<input checked="" type="checkbox"/>	Patient Instructions
<input checked="" type="checkbox"/>	LT: ICD15
<input checked="" type="checkbox"/>	Rx: Nitroglycerin, 6.5mg
<input checked="" type="checkbox"/>	Supplies: Nitroglycerin, B

Encounter Note: Chest Pain

Leonardo DaVinci, M.D.
Noteworthy Medical Systems, Inc.
11000 Cedar Ave. Suite 401
Cleveland, OH 44106
(XXX) XXX-XXXX x:108

April 20, 1999 2:29 AM

Lisa, Mona

DOB: June 16, 1969
Age: 29 years
Sex: F

Address: 123 West Main Street
Cleveland, OH 44106
Phone: (XXX) XXX-XXXX

Chief Complaint: Chest Pain 3 days

Subjective

CHEST PAIN

- Duration: A Few Days
- Onset: Chronic/Insidious
- Nature of Pain: Dull
- Diffuse: Epigastric
- Generalized Location(s): None
- Radiation: Occurs During Mild Activity
- Pattern: Inspiration, Exertion
- Aggravating Factors: Rest, Antacid use
- Ameliorating Factors: Chills, Nausea
- Associated Symptoms: Little or None
- Description of Normal Exercise:

Navigation: <Previous, Search, Signoff Password, Done

Fig. 21

22/25

<div style="display: flex; justify-content: space-between;"> Sign Chart The following orders and reports have been generated. Please review then by selecting them from the list: check the boxes for those that you would like to print. </div>																																																																																	
<input type="checkbox"/> Print?	<div style="border: 1px solid black; padding: 2px;">Document Name</div>																																																																																
<input type="checkbox"/> SOAP Note	<div style="border: 1px solid black; padding: 2px;">SOAP Note</div>																																																																																
<input type="checkbox"/> Patient Instructions	<div style="border: 1px solid black; padding: 2px;">Patient Instructions</div>																																																																																
<input type="checkbox"/> LT: 33315	<div style="border: 1px solid black; padding: 2px;">LT: 33315</div>																																																																																
<input type="checkbox"/> Rx: Nitroglycerin, 6.5mg	<div style="border: 1px solid black; padding: 2px;">Rx: Nitroglycerin, 6.5mg</div>																																																																																
<input type="checkbox"/> Samples: Nitroglycerin, 6	<div style="border: 1px solid black; padding: 2px;">Samples: Nitroglycerin, 6</div>																																																																																
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Labs / Radiology</p> <p>1 Cardiology, exploratory (includes removal of foreign body); with cardiopulmonary bypass</p> <p>Future appointments:</p> <p>1 The patient should return as needed for chest pain</p> </div> <div style="width: 50%;"> <p>Medications</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Rx</th> <th>DATE</th> <th>NAME</th> <th>DIRECTIONS</th> <th>QTY</th> <th>REFILL</th> <th>SPE INSTR</th> <th>PRESCRIBED BY</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>04/20/1999</td> <td>Nitroglycerin, 6.5mg (capsule so)</td> <td>Take as needed for chest pain</td> <td>50</td> <td>1</td> <td></td> <td>DaVinci, Leonardo</td> </tr> <tr> <td colspan="8">Samples:</td> </tr> <tr> <td>1</td> <td>04/20/1999</td> <td>Nitroglycerin, 6.5mg (capsule so)</td> <td>Take as needed for chest pain</td> <td>12</td> <td></td> <td></td> <td>DaVinci, Leonardo</td> </tr> <tr> <td colspan="8">REPORTED CHANGES</td> </tr> <tr> <td colspan="8">Started:</td> </tr> <tr> <td>2</td> <td></td> <td>Fes0.160mg (tablet so)</td> <td></td> <td></td> <td></td> <td></td> <td>Michelangelo</td> </tr> <tr> <td colspan="8">OTHER RECORDED MEDICATIONS</td> </tr> <tr> <td>2</td> <td>10/07/1998</td> <td>Indur, 30mg (tab sr 24h)</td> <td>TAKE ONE TABLET EACH MORNING</td> <td>30</td> <td>4</td> <td></td> <td>DaVinci, Leonardo</td> </tr> <tr> <td>2</td> <td>10/07/1998</td> <td>Pepcid, 40mg (tablet)</td> <td>PRN</td> <td></td> <td></td> <td></td> <td>DaVinci, Leonardo</td> </tr> </tbody> </table> </div> </div>		Rx	DATE	NAME	DIRECTIONS	QTY	REFILL	SPE INSTR	PRESCRIBED BY	1	04/20/1999	Nitroglycerin, 6.5mg (capsule so)	Take as needed for chest pain	50	1		DaVinci, Leonardo	Samples:								1	04/20/1999	Nitroglycerin, 6.5mg (capsule so)	Take as needed for chest pain	12			DaVinci, Leonardo	REPORTED CHANGES								Started:								2		Fes0.160mg (tablet so)					Michelangelo	OTHER RECORDED MEDICATIONS								2	10/07/1998	Indur, 30mg (tab sr 24h)	TAKE ONE TABLET EACH MORNING	30	4		DaVinci, Leonardo	2	10/07/1998	Pepcid, 40mg (tablet)	PRN				DaVinci, Leonardo
Rx	DATE	NAME	DIRECTIONS	QTY	REFILL	SPE INSTR	PRESCRIBED BY																																																																										
1	04/20/1999	Nitroglycerin, 6.5mg (capsule so)	Take as needed for chest pain	50	1		DaVinci, Leonardo																																																																										
Samples:																																																																																	
1	04/20/1999	Nitroglycerin, 6.5mg (capsule so)	Take as needed for chest pain	12			DaVinci, Leonardo																																																																										
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2	10/07/1998	Pepcid, 40mg (tablet)	PRN				DaVinci, Leonardo																																																																										
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>End of Report</p> </div> <div style="width: 50%;"> <p>(1) Signature: 222 Leonardo DaVinci, M.D.</p> <p>(2) Signature: 222 Andrea del Verrocchio</p> </div> </div>																																																																																	

<Previous

I now orders to be filled ☐ here or held for: ☐

Signoff Password:

Done

Search

214

216

220

222

23/25

Sign Chart

The following orders and reports have been generated. Please review them by selecting them from the list:
check the boxes for those that you would like to print.

Print?	Document Name
<input checked="" type="checkbox"/>	SUP Note
<input checked="" type="checkbox"/>	Patient Instructions
<input checked="" type="checkbox"/>	LT: 33315
<input checked="" type="checkbox"/>	Rx: Nitroglycerin, 6.5mg
<input checked="" type="checkbox"/>	Samples: Nitroglycerin, B

212

Noteworthy Medical Systems, Inc.
11000 Cedar Ave. Suite 401
Cleveland, OH 44106
Tel: (XXX) XXX-XXXX x:108
Fax: (XXX) XXX-XXXX

DOB: 06/16/1959
Date: 04/20/1999
Tel: (XXX) XXX-XXXX

Name: Lisa, Mona
Address: 123 West Main Street
Cleveland, OH 44106

Rx

Nitroglycerin, 6.5mg (capsule sol)
Disp: 50
Directions: Take as needed for chest pain

refill: 1 times ☐ OAM

Leonardo DaVinci, M.D.
DEA No. AL111111119

224

210

220

Signoff Password:

Done

< Previous

Fig. 23

90/070981

24/25

230

52 53 54 84

Patient Chart - LISA, Mona

Summary Hx and PE Order Entry Reasons for Visit: Chest Pain Add...

SOAP Time Line Analysis Data Sheets All Medications Consults

(Patient Photo)

64 56 24 58 26 60 66 62 28

Locked Patient Chart - LISA, Mona
Please type in your password to unlock this chart.

Name: Password:

Unlock Chart

12 14

Fig. 24

25/25

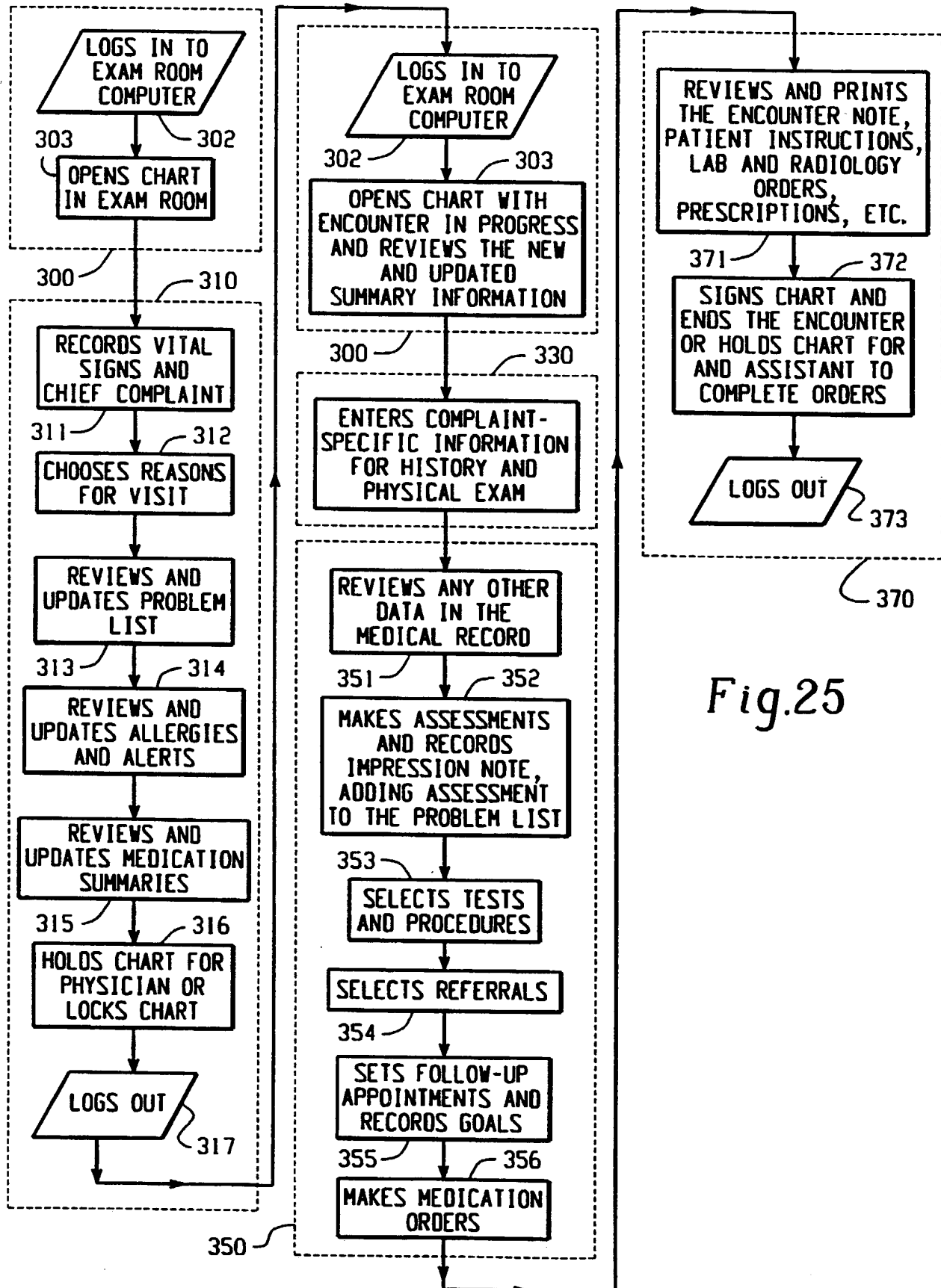


Fig.25

DECLARATION AND POWER OF ATTORNEY
(Joint Inventors)

We, Marvin S. Schwartz, David L. Abt, Nathan Arthur, Charles E. Bear, Donald N. Huff, Benjamin V. Schroeder, Steven D. Shabino, and Justin L. Shepard, hereby declare that we are, respectively,

a citizen of the United States of America, residing at 32515 Brighton Park Blvd., Solon, Ohio 44139;

a citizen of the United States of America, residing at 175 Canyon Road, Moreland Hills, Ohio 44022;

a citizen of the United States of America, residing at 1929 Green Road, #308, Cleveland, Ohio 44121;

a citizen of the United States of America, residing at 5138 Austen Lane, Cleveland, Ohio 44143;

a citizen of the United States of America, residing at 2091 West 11th Street, Cleveland, Ohio 44113;

a citizen of the United States of America, residing at 12491 Cedar Road, Apt. 8, Cleveland Heights, Ohio 44106;

a citizen of the United States of America, residing at 4170 Bushnell Road, University Heights, Ohio 44118; and

a citizen of the United States of America, residing at 14525 Polo Club Drive, Strongsville, Ohio 44136;

that we have reviewed and understand the content of the attached specification, including the claims (Jones, Day, Reavis & Pogue Docket No. 214255605002), and we believe that we are the original, first, and joint inventors of the subject matter which is claimed therein and for which a patent is sought on the invention or discovery entitled

**COMPUTER-BASED PATIENT RECORD (CPR)
MANAGEMENT SYSTEM AND METHOD**

and that we acknowledge our duty to disclose information of which we are aware which is material to the examination of this application, in accordance with Title 37, Code of Federal Regulations, Section 1.56(a).

We hereby claim priority on Provisional Application Serial No. 60/154,305, filed September 16, 1999.

We hereby designate the following as our mailing address and telephone number:

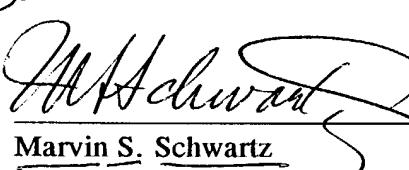
David B. Cochran
Jones, Day, Reavis & Pogue
North Point
901 Lakeside Avenue
Cleveland, Ohio 44114
(216) 586-3939

and appoint each of the following as our attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

13 David B. Cochran, Registration No. 39,142; Kenneth R. Adamo, Registration No. 27,299; Barbara Arndt, Registration No. 37,768; Regan J. Fay, Registration No. 26,878; F. Drexel Feeling; Registration No. 40,602; Calvin P. Griffith, Registration No. 34,831; Warren M. Haines II, Registration No. 40,632; Shawn A. McClintic, Registration No. 45,856; Timothy J. O'Hearn, Registration No. 31,552; Stephen D. Scanlon, Registration No. 32,755; H. Duane Switzer, Registration No. 22,431; Michael W. Vary, Registration No. 30,811; and James L. Wamsley, III, Registration No. 31,578;

all having the above-designated address.

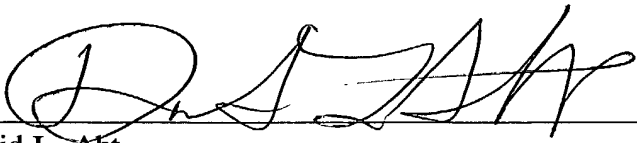
We further declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

100

Marvin S. Schwartz

Date 9/13/2000

Post Office Address:

32515 Brighton Park Blvd.
Solon, Ohio 44139 *off*

200

David L. Abt

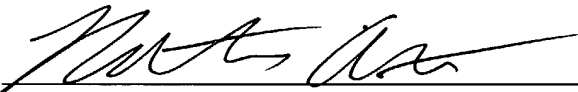
Date

9-14-00

Post Office Address:

175 Canyon Road
Moreland Hills, Ohio 44022

OH

300

Nathan Arthur

Date

9-14-00

Post Office Address:

1929 Green Road, #308
Cleveland, Ohio 44121

OH

400

Charles E. Bear

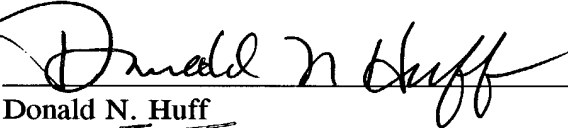
Date

9-14-2000

Post Office Address:

5138 Austen Lane
Cleveland, Ohio 44143

OH

300

Donald N. Huff

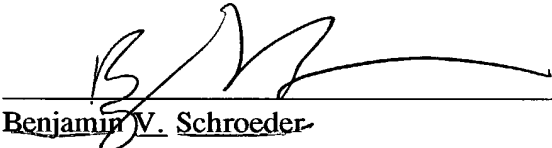
Date

9.14.2000

Post Office Address:

2091 West 11th Street
Cleveland, Ohio 44113

OH

600

Benjamin V. Schroeder

Date

9/14/2000

Post Office Address:

12491 Cedar Road, Apt. 8
Cleveland Heights, Ohio 44106

OH

Steven D. ShabinoDate 9/14/20007 Steven D. Shabino

Post Office Address:

4170 Bushnell Road
University Heights, Ohio 44118

off

8w Justin L. ShepardDate September 14, 2000

Post Office Address:

14525 Polo Club Drive
Strongsville, Ohio 44136

off